American Forestry

VOLUME 28 OCTOBER, 1922 NUMBER 346

FORESTS OF WEST PERSIA

THE WHITE OAKS

FORESTS OF MINNESOTA

CORVUS THE CROW

LUMBER INDUSTRY'S FUTURE

FOREST INSECTS

The American Forestry Association

Washington, D. C.

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Declaration of Principles and Policy of the American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watershed; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people, that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay $387,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions, that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management, respectively; adequate appropriations for their care and management; Federal co-operation with the State, especially in forest fire protection.

State activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and encouragement and extension individually and by co-operation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose, and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid to lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal National and State appropriations for this work.

AMERICAN FORESTRY

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WASHINGTON, D. C.

PERCIVAL SHELDON RIDSDALE, Editor

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CHANGE OF ADDRESS

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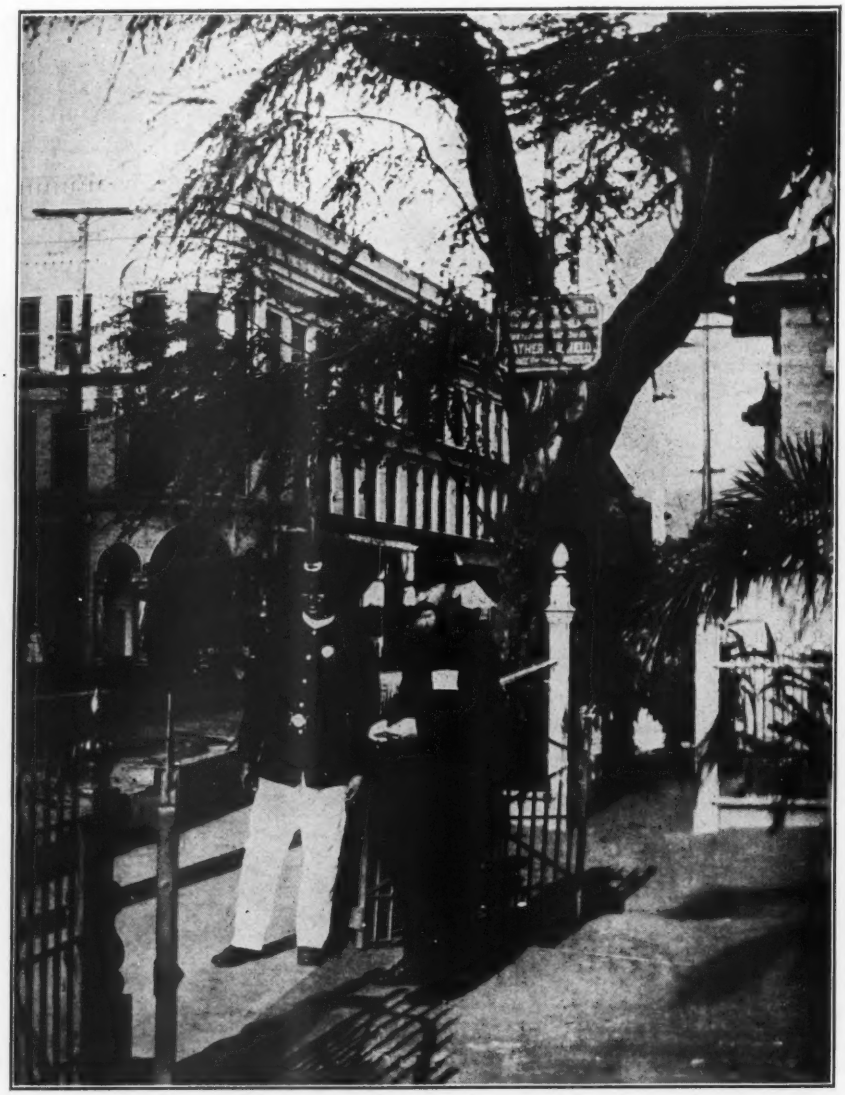
"THE HALL OF FAME FOR TREES"

Here is the first algaroba tree ever planted in the Hawaiian Islands and it is nominated for a place in the Hall of Fame by M. J. Riordan, of the Arizona Lumber and Timber Company, of Flagstaff, Arizona. The tree is on Fort Street, in Honolulu, in front of the cathedral. Mr. Riordan informs the Association there is a move on to destroy the tree to make way for a new building and he enters protest against this move because of the history connected with the tree. On the tree is a sign which reads: "First Algaroba Tree of the Hawaiian Islands, imported and planted in 1837 by Father Bachelot, founder of the R. C. Mission."

At the request of the Right Reverand Bishop Libert, the Rev. H. Valentine informed Mr. Riordan that Father Bachelot brought a few of the seeds with him from southern California. From this tree the thousands in the Islands have their origin. Six of the original trees have been destroyed to make way for buildings and this is the only one remaining.



THE HAWAIIAN ALGAROBA

AMERICAN FORESTRY

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WEST PERSIA--THE WOOD-FAMINE COUNTRY

By Edward C. M. Richards

WEST PERSIA is now a land of famine, both food famine and timber famine, although the food famine attracts the most attention. Nevertheless the fact remains that the food famine is paralleled by a timber famine which is much more permanent and much harder to overcome. The news from West Persia for the past few years has been largely filled with the food needs of this ancient land, but for hundreds of years the fuel, timber and forest products famine has been always present and always a crying need to those who had eyes to see and ears to hear. But because West Persia is one of the most out of the way places on earth little has been heard of it and practically nothing has come to us here in the way of information regarding the wood famine existing there.

By West Persia this article means the extreme northwest portion of Persia and includes that portion of the country known as the Province of Azerbijan. This province lies directly south of the former Russian Province of Trans-Caucasia, or what is better known as the Southern Caucasus. To the West rises the great 13,000 foot mountain range of Kurdistan which follows—on its eastern edge—an irregular line from Mount Ararat down to the Persian Gulf and which marks the boundry between Persia and Turkey. To the east the Caspian Sea lies several thousand feet below the level of the great plateau on which all of Persia stands. The province extends some two hundred miles south from the Persian-Caucasian boundry and is the most fertile and beautiful part of Persia.

To us here in America where there is such an abundance of wood and such a large variety of species of trees it will be interesting and helpful to consider briefly some of the results of a timber famine so that the seriousness of forest devastation in a country may be better appreciated.

SACRED ELM TREES OUTSIDE A MOSQUE. CAREFULLY GUARDED, THESE MAGNIFICENT TREES ARE A REMINDER OF THE LUXURY OF TREE GROWTH PREVALENT IN PERSIA IN THE DAYS OF HER GLORY BEFORE RECKLESS WASTE OF A FORMER GENERATION MADE HER PEOPLE OF TODAY SUFFER A WOOD FAMINE.

Take first the matter of fuel as one of the first necessities of all men. There are some low grade coal measures in West Persia but they have not been developed beyond the point where a man with a pick and shovel digs what he can out of a shallow hole in the grounds, and as the coal is full of sulphur and is very

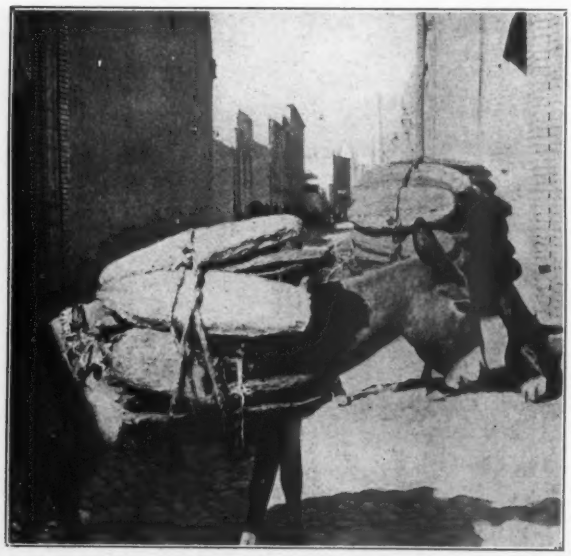
A PERSIAN COBBLER "SAVING SOLES." PERSIAN SHOES ARE EITHER SEWED OR NAILED WITH WOODEN PEGS.

poor, this source of fuel does not enter into the fuel situation to any great extent. Crude petroleum and kerosene are available along the one line of railroad which runs from the Russian boundary to Tabriz, or when transported from the Caspian Sea ports by pack-train. The oil comes from the great Baku oil fields, but although the railroad engines are oil burners there is practically no oil used for fuel. Kerosene for lighting purposes is very common, the oil being carried many miles into the interior of the country on the backs of animals. The result of the lack of coal and the expense of oil is to throw the burden of furnishing heat for heating rooms, cooking and for industries, upon the forest products of the country, and owing to the destruction of the forests this burden is very heavy. This problem is solved—or an attempt is made to solve it—by two methods. These two methods of securing heat are practically universal; the exception being in the case of the very few foreigners and the few wealthy people who have wood burning stoves and who are buying fruit wood for fuel, and both of these are of real interest so that some account of each method will not be amiss:

Charcoal is used by everybody to make his or her tea with—for everybody drinks tea several times a day, when they can get it. The Russian samovars in all sizes, shapes and materials are used in making them, the spherical brass type being the most common.

Practically everybody has some form of a samovar—as tea is looked upon as a necessity, and the consumption of charcoal for this purpose is large. Another use for charcoal is in cooking "kibobs" which are little pieces of meat broiled over a little brazier of hot char-

A PERSIAN THRESHING MACHINE IN ACTION. AS THE "SLED" IS PULLED FORWARD, THE CROSS STICKS WITH THE PROTRUDING KNIVES REVOLVE, CUTTING UP THE STRAW.



A PERSIAN "FLIVVER" LOADED WITH NATIVE FUEL—MOULDED MANURE CAKES.

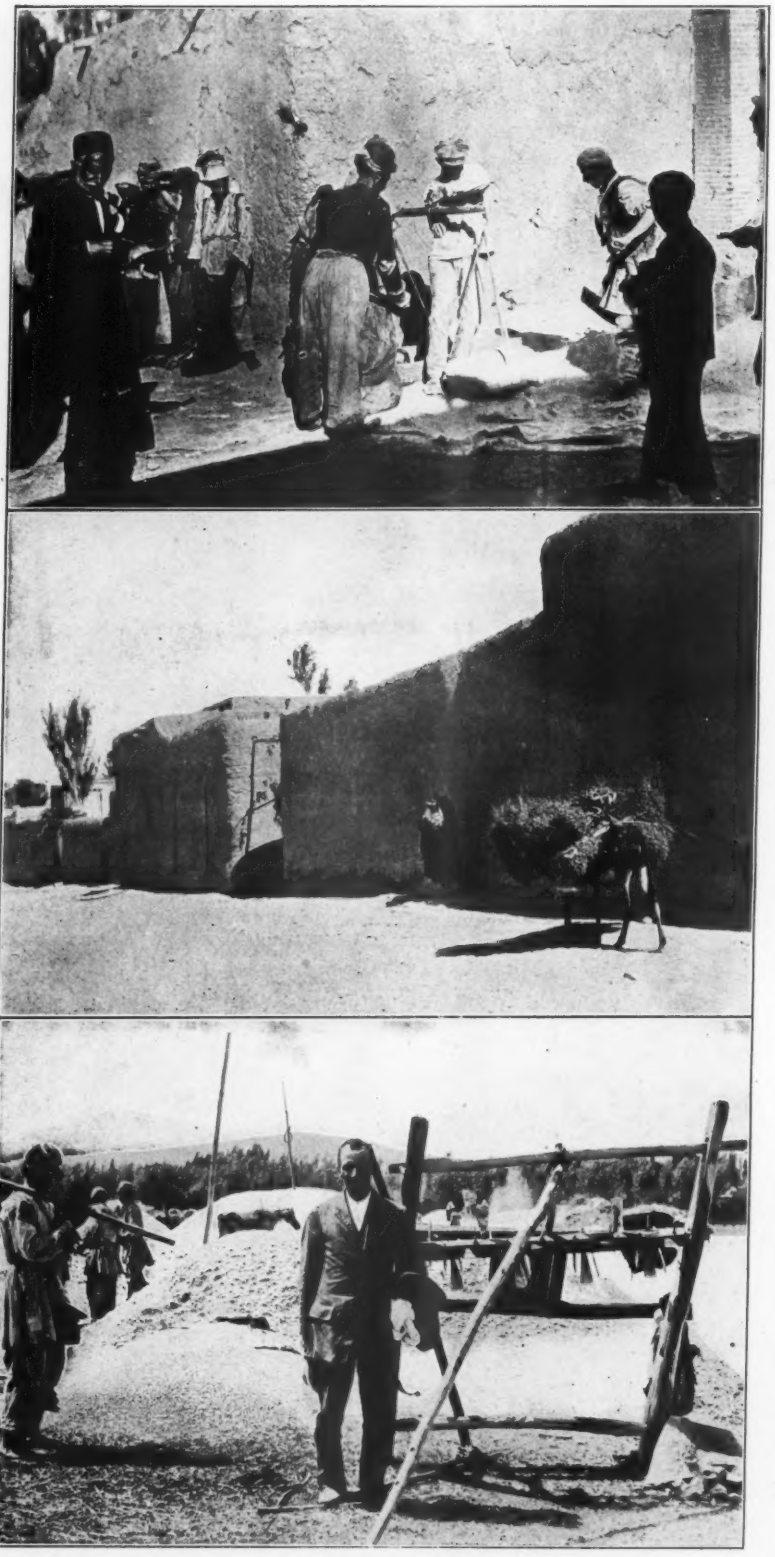
coal. This is a very popular dish and, in the streets and in the bazaar these kibobs may be bought at any time during the day. In the private homes also a good deal of cooking is done over charcoal. Then in cold weather charcoal is used in the "kursies." A kursie is about the cheapest arrangement for keeping the whole family warm. First of all a low table, perhaps two feet high and two feet or more square—is placed in the middle of the room. An earthen or iron pan or vessel with dirt in the bottom on which is a hot fire of charcoal is placed on the floor under the table. Then the entire family gathers around and sitting on the floor stick their feet under the table close to the panful of hot coals. A big quilt is put over the top of the table and falling down around the sides covers the entire family. In most of the houses there is no general system of heating and the houses are cold, so that the people are forced to sleep and practically live under "kursies" in

cold weather. The consumption of charcoal for fuel therefore is very great. Industrially also much charcoal is used. The blacksmiths, silversmiths, and other metal workers use it and taking it all in all charcoal is a most important forest product in West Persia. It is made in the villages and brought into towns and cities on donkey back.

LOOKING DOWN ON AN UNPROTECTED PERSIAN VALLEY. THE EROSION HERE, FOLLOWING COMPLETE DENUDATION, IS VERY GREAT.

To an American the use of charcoal as a fuel does not seem very primitive and one soon gets used to it. But it comes rather as a shock to see how almost anything and everything that will burn is "cast into the oven"—for that is the right term to use in describing the stoking of the bake-oven of the country. In the fall the poor women go out into the fields and orchards and get permission to pick up the dead twigs, leaves, etc., and carry them away in bags. Then most of the manure is moulded into cakes, left to dry in the summer sun until firm enough, and then stacked carefully in big piles so plastered over as to shed water, and so kept until the time comes to burn them. This practice of burning up all of the manure means a steady robbing of the soil and a steady deterioration of the quality of the agricultural land. This is a good illustration of direct effect of forest

A TYPICAL PERSIAN LANDSCAPE WITH A VILLAGE IN THE MIDDLE BACKGROUND. THE OUTLYING COUNTRY HAS BEEN STRIPPED BARE OF VEGETATION TO FURNISH THE NECESSITIES OF LIFE TO A WOOD-STARVED PEOPLE.



EVERYDAY LIFE IN PERSIA

Upper—The distribution of flour. Note the wooden bar to the scales and the wooden shovel. Close attention is given to the weigher.

Middle—A street scene. The donkey is loaded with thorn-bushes to be used for fuel.

Lower—Close-up of a threshing machine. The revolving cross-shaft holds the chisel-shaped iron knives that cut up the straw.

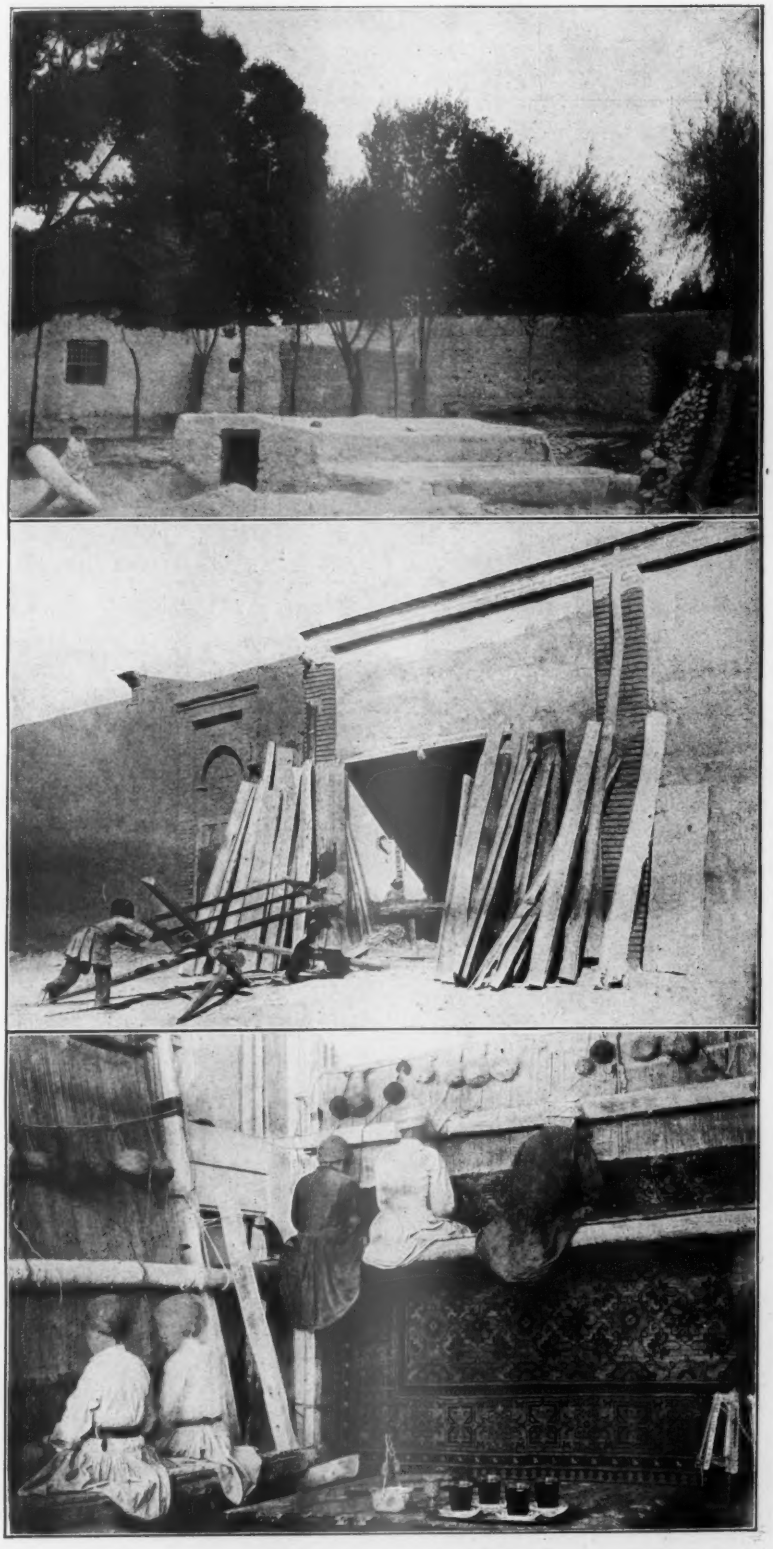
devastation upon agriculture and so upon the prosperity of a country. And this "native fuel" as manure cakes are called, is one of the chief fuels used in the bakeries, both public and private.

There is one great lesson to be learned from the fuel situation in West Persia, and that is the extreme to which the people of a country are forced to go when their forests have been destroyed. Everything in the way of fuel is burned up. The powdered charcoal in the bottom of the bags or containers is dampened and pressed together and used for fuel. The trees scarcely begin to shed their leaves before small boys shake them to hasten their fall or even climb up into the trees and pull the leaves off with their hands. Out in the country not a thing is left, in the way of fuel, except in very out of the way sections and in places where constant guardianship is exerted over the trees—or where some religious element protects trees from the wood-hungry people. And it is there that the absence of wood strikes one most. There are no fences, no woodlots worthy of the name, and the fact that the country is in a state of wood famine is constantly borne in upon the visitor. If the people of America could only spend a week traveling through West Persia there would be an entirely different degree of interest in the maintenance and enlargement of our forest resources here in this country.

Another use that wood is put to is in the construction of houses. But here again the wood famine stares us in the face. In the United States all of the cheap houses are made of wood of some sort, and in almost every type of building wood is used in some way. But in West Persia common adobe mud—used in bricks or in the mass—makes up most of the building material, wood being used only in the doors, windows and the framework of the roof. The covering of the roof is a thick layer of well pounded mud. In the winter, however, every fall of snow must be shoveled off at once, for

otherwise it would melt and ruin the roof. And every year, or at least once in two years, the roof has to be gone over, perhaps resurfaced and pounded. How much better it would be and how much safer and with how much of a saving in work every year, if the mountain cedar—one or two scattered specimens of which the writer found up in the wilder portions of the country—were systematically grown for shingle stock. This could be done and the housing conditions of the whole country could be revolutionized. And what a short-sighted policy on the part of the country—or of any country for that matter—to destroy the forests and then have to adopt some such clumsy, inefficient and dangerous method to use as a substitute for the wooden articles. Yet that is just what America is doing today, just as rapidly as it very well can be done.

The presence of wood famine is noticeable in the furnishing of the houses as well as in the houses themselves. For instance the floors are never of wood, not seldom, but *never*. In the poor houses the floor is just mud and in the better houses rough flat brick or a poor sort of mixture of mud, clay and lime, called "native cement" takes its place. The result is that the floors are cold, hard and damp. The doors are usually made of poplar lumber which has been badly sawn and badly seasoned. All of the sawing is done by hand in "pit saws" where one man stands on top of the log and one man stands in a pit underneath it, as they saw the planks out of the timber. The result is that the doors are apt to warp, check and crack so that in a short time seams open up and the door is spoiled. As for the furniture fully 99/100 of the population never sleep in any kind of a bedstead during their lives. Instead, rugs are spread on the floor and then with thin mattresses and wool quilts and pillows the bed is made up. In fact it is only in the large cities and in the homes of the very wealthy people and among those few who have been out of the country and



PERSIAN INDUSTRIES

Upper—A Persian flour mill. Note the tree trunk set in the pile of staves to the right. This is hollow and carries the water down to the waterwheel below.

Middle—Ripsawing poplar lumber in a Persian carpentershop.

Lower—A Persian rug loom. The boys sing as they work. Note the wooden thread winder in the right background.

WOODEN SHUTTERS ON THE SHOP OF A PERSIAN BAKER. THE MAN ON THE EXTREME RIGHT IS LEAVING THE SHOP WITH A LARGE PIECE OF BREAD IN HIS HAND AND A PILE OF THORN-BUSH—TYPICAL FUEL—IS ON THE GROUND OUTSIDE.

have seen western methods that any sort of furniture is used at all. The people sit on the floor, eat off the floor, put their things in bags, or if they have seen something of western ways, in some sort of cheap chests, or perhaps some poor European trunk. Sometimes there will be a large grain box to keep their grain in, and perhaps a small box to keep their weekly supply of baked bread in, and these will be the only articles of furniture in the homes of literally thousands of people. And the reason is that wood is so expensive, and of such poor quality and of such small size that the people have to get along without using it. To an American a home without any closets, any bureaus, any cupboards, any tables, any chairs, beds, lounges or desks seems impossible. But this is not exaggeration. It is a cold fact. And the cause behind the fact is *wood scarcity*. And forest devastation brought this wood scarcity upon West Persia.

Fuel, house construction, house furnishings—these are the chief uses that wood is put to in West Persia. To a person interested in the problem, however, other uses are made of wood as well, but on a much smaller scale.

A TYPICAL PERSIAN STREET IN A LARGE CITY. NOTE THE SMALL AMOUNT OF WOOD USED IN THE HOUSES.

A TYPE OF PRESENT DAY PERSIA—A REFUGEE KURD. HIS PIPE STEM IS MADE OF CHERRY WOOD.

The looms on which the native cloth is woven and on which the famous Persian rugs are made are mostly made of wood, but these looms last a lifetime so that there is little consumption there. Straight sticks of cherry are used for pipe stems and cigarette holders, the holes being bored for you while you wait by the keeper of the little shop in the bazaar. The upright stem and the mouth pieces of the "hubble bubble" water pipes are of turned wood. The cobblers use wooden shoepegs, and the saddlers use wood for their trees.

A TILLER OF THE SOIL PAUSES TO PERMIT THE MAKING OF A PICTURE OF A TYPICAL PERSIAN PLOUGH.

Out in the country the trunks of the willows are sometimes hollowed out and used as chutes to guide the little streams down to the paddles of the water wheels which grind the flour for the region. The water wheels are of wood also. The snow shovels used to clear off the roofs with, and the shovels and forks used in handling the grain upon the threshing floor are of wood. The ploughs and harrows, and the machine used to thresh out the grain—being dragged about over the threshing floor by oxen or horses, a small boy being used as a weight—these are other minor ways in which wood is used. Then in the shops and in the bazaar the shutters which are folded and locked up every night are of poplar lumber, as are the frameworks supporting them.

The conditions of life in West Persia stated in this article are not the conditions of fifty years ago. They are as they exist today, in 1922. To an American it seems as if these people must have been lost in the ignorance and backwardness of the men of the stone age until early in this century. But when our ancestors were running about in skins with stone hatchets and spears, Darius, the Persian, was the Great King of the then known world, and the Persian civilization was "the" thing, and the Persian people of that time had excellent reasons to expect that the world would always see Persia and Persian civilization at the head of it. The United States has existed now for less than 150 years. During that time we have taken the example of Persia in regard to the treatment of our forest resources for the most part, and are using them up now just as rapidly as we can do so, regardless of everything but the immediate present and the immediate profit. Three thousand years from today—no, three hundred years from now—what will be the judgment of our children's children and of that generation? Today America is a great and rich and powerful nation. So were the countries of Assyria, Babylonia and Persia in their prime. And today they do not exist at all or are "backward" in every way. It is important for us to consider these things if we truly love our country. And what we do now with our forests has a tremendous effect on what America will be in the days to come.

HOW BIG IS A BIG TREE?

Park Naturalist Ansel F. Hall, of Yosemite National Park, has prepared this section of a giant sequoia, which was felled by a storm in 1919, to show visitors how huge and how old Yosemite's trees are. This tree was comparatively small—only 14 feet in

diameter at the base and nine feet at a point sixty feet above the base, where this section was cut; Yosemite has one tree that is 29.6 feet in diameter and many that are more than 20 feet. This tree also was comparatively young, only 996 years old, as compared to 4,000 years, the estimated age of Grizzly Giant, largest tree in Yosemite.

The chalk rings on the tree indicate the years in which important historical events took place—Battle of Hastings, Discovery of America, Declaration of Independence, etc. The space between the Naturalist's forefinger and thumb measures the span of a long human life to compare with the span of this tree's life.

THE WHITE OAKS

By Joseph S. Illick

THE oaks are world famous. For many centuries they helped civilized man in his conquests and industrial enterprises. The ancients worshipped the mighty oak and Socrates looked upon it as the "tree of knowledge." The history and literature of England is closely associated with the oak tree. The early Britons and later conquerors held it in high regard. In America, the Charter Oak holds a prominent place in our colonial history.

There are many majestic memorial oaks in the eastern states under whose sturdy branches took place some of the great historic events of our early national history. Among them is the "Witness Tree" still standing before the Donegal Presbyterian church, in Lancaster county, Pennsylvania, under whose spreading branches the members swore allegiance to our country in June, 1777.

Every woodsman and forester loves the Oaks. They are admired for their physical sturdiness, great age, and the high value of their wood. They are attractive at all seasons of the year, whether in the first pale dress of spring tinged with delicate pink, the deeper tones of summer, the rich purple, scarlet or red of autumn, or the dull brown of Indian summer. Perhaps the oaks are most impressive and picturesque in winter when their mighty branches stand out boldly against the sky. No other group of trees have such a commanding appearance.

Most of the oaks attain a great age and reach a large size. Some European oaks are believed to be 1,000 years old, and a few American specimens are known to exceed 500 years. The real merit of the oaks is in the excellent wood that they produce. It has a wide range of commercial uses, and holds a prominent place in almost every American wood-using industry.

The nuts and the bark of some oaks also have considerable commercial value. The Indians, and the early white settlers, used the white oak acorns for food. During the world war all the seeds produced by the oaks, beech and chestnut of continental Europe and Great Britain were used by man. They furnished much-needed food for man and domestic animals. In the olden days the fattening of hogs on fallen acorns and beech nuts was an established practice. In some forests as many as 20,000 hogs were fattened every year.

The bark of some oaks is rich in tannin while that of others yields valuable dye material. The bark of the Rock or Chestnut Oak is harvested annually in large quantities. It is rich in tannin, which is manufactured

THIS MIGHTY WHITE OAK STANDS ALONG THE BRANDYWINE CREEK IN PENNSYLVANIA. IT IS 25 FEET IN CIRCUMFERENCE AT THE GROUND, 80 FEET HIGH, AND HAS A BRANCH SPREAD OF 107 FEET.

THE BARK OF THE WHITE OAK BREAKS UP INTO LONG PLATE-LIKE SCALES.

into tannic acid and used in the preparation of leather. The inner bark of the black oak contains a yellow dye material that is used locally in the preparation of various cloths, particularly khaki. Large quantities of this bark were harvested during the world war, and helped to relieve the great shortage in domestic raw dye materials felt so keenly in many industries.

The oaks satisfy many of man's essential needs. They have been a big factor in our national gorwth, and worth while efforts should be put forth to maintain a worthy place for them in our future forests. A large part of man's high regard for the oaks is due to their great number and wide distribution. There are more than 300 different kinds of oak trees in the world. The center of their distribution is in Central America and Mexico, but they are widely distributed in temperate regions. Of the 300 species of oak that are known in the world, 55 are native to North America, and as many as 20 different oaks are known to occur in a single eastern state. In addition to the 300 recognized species of oak, there exist an almost endless number of hybrids and varieties. The different oak trees show such a wide range of characteristics that the following three groups are now recognized:

I. WHITE OAKS

They mature their acorns in one season and have leaves with rounded lobes. The kernels of the nuts are usually sweet. They are sometimes called *Annual Oaks*, because they mature their acorns in a single season.

II. BLACK OAKS

They mature their acorns in two seasons, and have bristle-pointed leaf lobes. The kernel of the nuts is usually bitter. They are sometimes called *Biennial Oaks*, because it takes two seasons for their acorns to mature.

THE LARGE, LEATHERY, SQUARISH LOBED LEAVES OF THE POST OAK ARE DISTINCTIVE. THE THREE TERMINAL LOBES ARE THE LARGEST. THE TWIGS AND LOWER LEAF-SURFACES ARE COVERED WITH RUSTY HAIRS.

III. LIVE OAKS

They retain their leaves two or three seasons, while all other oaks shed their leaves annually. *Evergreen Oaks* is another name for this group.

Some of the most important timber trees of the world belong to the white oaks. Representatives of this group are found in every part of the United States, and among them are some of the best forest trees of continental Europe and Great Britain. The most important American members are:

COMMON NAME	SCIENTIFIC NAME
1. White Oak	*Quercus alba*
2. Swamp White Oak	*Quercus bicolor*
3. Bur Oak	*Quercus macrocarpa*
4. Post Oak	*Quercus minor*
5. Chestnut Oak	*Quercus Prinus*
6. Yellow Oak	*Quercus Muhlenbergii*
7. Valley Oak	*Quercus lobata*
8. Garry Oak	*Quercus garryana*

The White Oak is the most important hardwood tree in eastern North America. It usually has a tall, broad and round-top crown. It may reach a height of 150 feet and occasional trees attain an age of 500 years. It prefers rich and moist situations, but will grow on almost every kind of soil found within its natural range fram Maine to Minnesota and south to Florida.

In summer the White Oak can be distinguished by its loose scaly, grayish bark and by its deeply rounded-lobed leaves. The leaves of all members of the Black Oak group are bristle-tipped and the other members of the White Oak group have leaves with shallow indentations on the margin or else they differ from the true White Oak in outline and texture. In winter the White Oak can be distinguished by its slender, small reddish brown pointed buds. These characteristics should enable any one to recognize this important forest tree which is so common in our for-

IMMATURE AND MATURE WHITE OAK LEAVES ARE DISTINCTIVE. IT IS NOT UNUSUAL FOR THE WHITE OAK TO PLACE ITS SEASON'S GROWTH IN TWO INSTALLMENTS.

THE SWAMP WHITE OAK HAS A DEEPLY AND REGULARLY FURROWED BARK.

ests and woodlot, and promises to play a big role in the forests of the future.

The wood of white oak holds first place among our native oaks. It is ashy-gray in color, closely grained, hard, tough, durable, and weighs about 46 pounds per cubic foot. No other wood has so wide a range of uses and satisfies so many human wants.

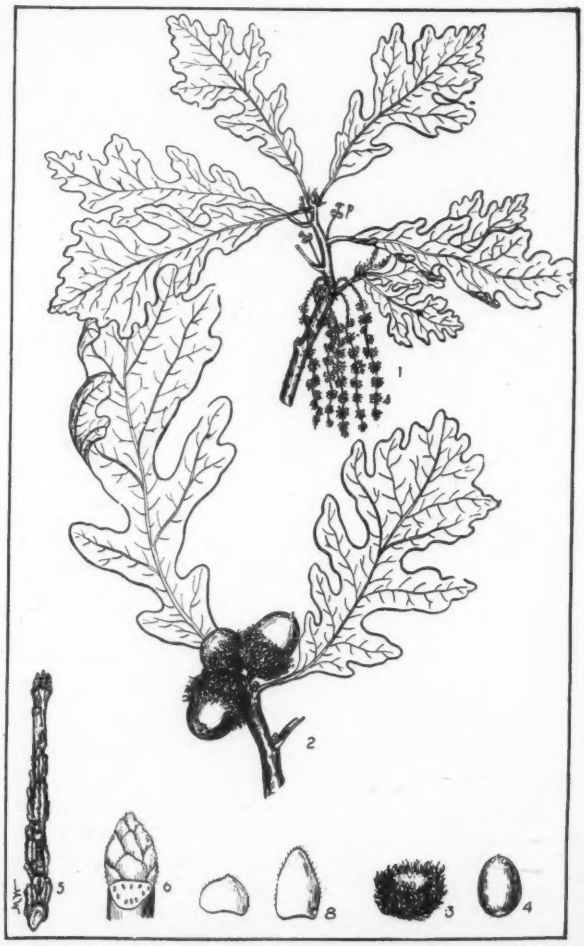
The Swamp White Oak has an appropriate common name, for it is truly a white oak and usually occurs in swamps or other wet places. It is an average-sized tree, usually attaining a height of 60 to 70 feet, but an occasional specimen may reach a height of 100 feet and a diameter of 3 feet. The famous "Wadsworth Oak" was a Swamp White Oak. It took its name from the estate upon which it grew and reached a circumference of 27 feet. For many years it stood on the bank of the Genessee River, about one mile from the village of Genesee, New York. A large number of people traveled many miles to see this natural wonder which finally was destroyed by the washing away of the river bank.

The Swamp White Oak can be distinguished from other oaks at any season of the year by the bark on the younger branches which peels off in thin large flakes. This characteristic is also common to the Buttonwood or Sycamore. In summer it can be recognized by the leaves which have very shallow indentations between the lobes, giving the leaves a rather broad appearance. In fall the long-stalked acorns with their cups enclosing about one-third of the nut, are also characteristic. In winter the rather stout-yellowish to reddish-brown twigs and the small blunt-pointed buds, covered with chestnut brown scales, are distinctive. The irregular, often drooping position of the lower branches is quite peculiar to this tree, and may often help to recognize it.

The Swamp White Oak occurs naturally from Maine and Quebec to Michigan and south to Georgia and Arkansas. It may be classified as an important timber tree, but does not rank so high as the true white oak. Its lateral branches have a tendency to persist for many years. This results in an inferior grade of lumber. It possesses no special ornamental qualities which recommend it for landscape work, but it will continue to be an important member of the future forest structure in wet places.

The Post Oak is a well-known and widely distributed member of the white oak group. It reaches its best development in the Mississippi Valley, but it is also of commercial importance in other parts of its natural range from Massachusetts and Central Pennsylvania to Kansas, Florida and Texas. It usually occurs on dry, rocky soil, but it is not unusual to find it on gravelly uplands, sandy plains and limestone hills.

It is easy to recognize the Post Oak in summer by its



THE BUR OR MOSSY CUP OAK HAS MOSSY FRINGED ACORN CUPS, CORKY-WINGED TWIGS, AND LARGE, ROUND-LOBED LEAVES.

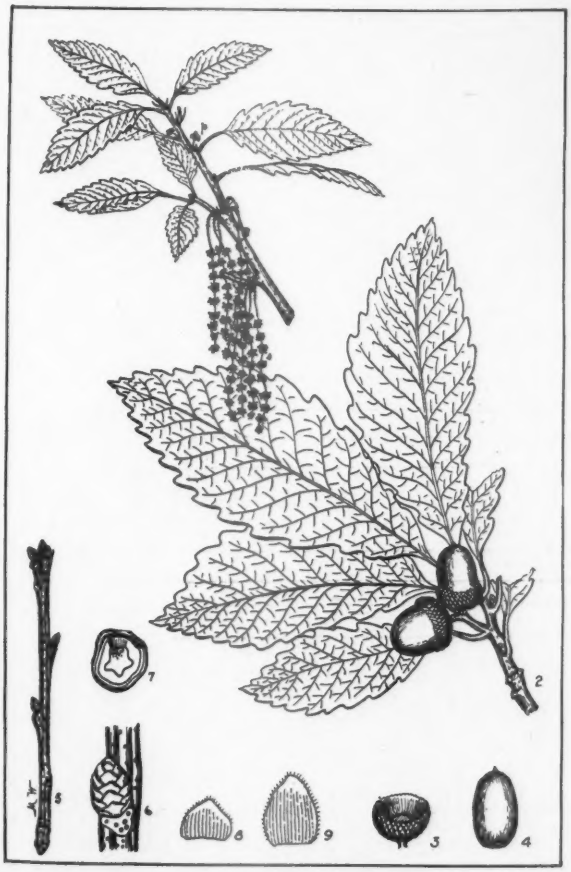
peculiar leaf form, the lobes of which are rounded or square. The three terminal lobes of the leaves are the largest and the basal lobes taken together are wedge-shaped. These unusual features give the leaves a distinctive appearance. The rigid leathery texture of the leaves and their shiny green upper surface and their rusty lower surface, are also helpful in recognizing the Post Oak. If one examines the lower leaf surface with a magnifying glass it will show star-shaped rusty hairs over the entire surface.

In winter the Post Oak may be recognized by its short blunt-pointed buds and its stout, rusty and hairy twigs. The buds are about the same size as those of the white oak, but they are bright-reddish in color.

In the northern part of its range the Post Oak is usually a small tree, but in the lower Mississippi Valley, where it reaches its best development, it sometimes becomes 90 feet high and 4 feet in diameter. Locally in the Mississippi Valley it is the commonest member in the oak forests. The wood is firm and very hard, which may have given it the name "iron oak." It decays slowly when placed in contact with soil which accounts for its extensive use for fence posts, and presumably this is the reason why it has the common name "Post Oak."

No oak has more striking distinguishing characteristics than the Bur Oak, which is one of the largest of our native oaks. It is also called "Mossy Cup Oak," for the acorns are fringed along the margin to such an extent that they give an appearance of moss. The acorn cups are unquestionably the most unique of all oak acorn cups. Some of the thrifty bur oak trees in the Mississippi Valley develop such large acorn cups that they are called "bird nest" cups. This appropriate name was given to them for they resemble bird nests in size, form and general appearance.

A BIG BUR OAK WHICH IS 24 FEET IN CIRCUMFERENCE AT THE GROUND, AND OVER 200 YEARS OLD.



THE CHESTNUT OAK MAY BE RECOGNIZED BY ITS DISTINCTIVE CHESTNUT-LIKE LEAVES, LONG-POINTED BUDS, AND LARGE ACORNS.

The leaves of the Bur Oak are usually as distinctive and unique as the acorn cups. On each side and near the middle of the leaves occurs a deep-rounded cleft which extends almost to the mid-rib, and practically divides the leaves in two parts. The terminal part of the leaves has large square lobes and the basal part resembles a triangle. The twigs are fully as distinctive as the acorn cups and the leaves. Upon them are found corky winged projections which stand out from the twigs for an inch or more. This characteristic is found in only a few other trees, such as cork elm and sweet gum.

The Bur Oak is one of the largest of the American oaks. It is usually from 70 to 80 feet high, but a few specimens have been reported that reached 170 feet in height and 6 to 7 feet in diameter. It usually occurs in low, rich bottom lands from Nova

THE SHARP-POINTED LEAVES AND THE SMALL STALKLESS ACORNS ARE HELPFUL IN RECOGNIZING THE YELLOW OAK.

Scotia to Manitoba, south to Pennsylvania, Kansas and Texas. This tree has not only a wide distribution and attains a large size, but it also produces very valuable wood, and is planted rather extensively for ornamental and shade purposes. It is easy to transplant, grows fast, develops an attractive form, has few insect enemies, and withstands smoke better than most of the oaks.

The Chestnut Oak or Rock Oak is an important member of the White Oak group. The name Chestnut Oak was given to this tree because its leaves resemble those of the common chestnut, which enables one to recognize it with little difficulty. This tree is also called Rock Oak. This name refers to the hardness of the wood, and is confined to this tree alone for the adjective "rock" is a part of the common names of a number of trees that produce hard wood. Sometimes the adjective "iron" is substituted for "rock" as in the case of Ironwood. The name Tanbark Oak is also locally applied to this tree because its bark is harvested in large quantities for tanning purposes. Locally it is also called Mountain Oak, because it is usually found on mountain sides and hilltops.

The Chestnut Oak may be distinguished at any season of the year by its bark. On young stems it is smooth, thin and yellowish-brown. On old trunks it is thick, brown to black and very deeply furrowed. The bark ridges are solid, not scaly, and are separated by deep and sharp-angled furrows. The bottom of the furrows is often cinnamon red in color, which enables one to distinguish it from any other oak. In winter the Chestnut

THE BARK OF THE CHESTNUT OR ROCK OAK IS DEEPLY FURROWED.

Oak can be distinguished by its slender, angular, orange-brown twigs and by its sharp-pointed buds about one-fourth to one-half inch long, which are clustered at the ends of the twigs.

The Chestnut Oak occurs on dry hillsides and moist fertile foot hills from Maine to Ontario and south to Alabama and Tennessee. It is an important forest tree, for it grows rapidly, produces valuable wood, and yields bark which is rich in tannin. It usually grows to a height of 60 to 70 feet and sometimes reaches 100 feet with a diameter of 2 to 5 feet. This tree is a big factor in replacing the chestnut that has been killed on so large a scale by the blight. The killing of the chestnut left large vacancies which have since been filled up by thrifty clumps of rock oak. Given a chance, the Rock Oak will grow rapidly and produce valuable wood. As soon as the real merits of this tree become known it will be given a prominent place in the forest practice of the eastern states.

An oak closely related to the Chestnut Oak is the Yellow Oak. It is also called Chinquapin Oak, Scrub Oak, Dwarf Chestnut Oak, and Pin Oak. It should not be confused with the true Chestnut Oak, for it has distinctive features, grows on different soil, and is of less commercial importance. It can be distinguished from the true Chestnut Oak by its small acorns, which are usually sessile. The buds are smaller and the leaves more sharp-pointed than those of the true Chestnut Oak. The flaky gray bark is also distinctive. The Yellow Oak occurs commonly on limestone soil, but is often found on dry ridges from Vermont to Minnesota and south to Florida and Texas. It is a beautiful tree and should be planted extensively in parks and

THE SWAMP WHITE OAK CAN ALWAYS BE RECOGNIZED BY ITS LONG-STALKED ACORNS, AND ITS LARGE, SHALLOW-LOBED LEAVES.

lawns on account of its handsome form and attractive foliage.

Of the more than 55 oaks found in the United States, 14 inhabit the Pacific Coast region. Some of them are

A BIG WHITE OAK WHICH AT THE GROUND HAS A CIRCUMFER ENCE OF 31 FEET. IT STANDS NEAR KUTZTOWN, PENNSYLVANIA, AND IT IS REPORTED THAT AN AMMUNITION TRAIN OF THE CONTINENTAL ARMY CAMPED UNDER THIS TREE ABOUT THE TIME OF THE BATTLE OF GERMANTOWN.

representatives of the White Oak group, while others belong to the Black Oak and Live Oak groups. The two principal members of the White Oak group are:

COMMON NAME	SCIENTIFIC NAME
1. Valley Oak	*Quercus lobata*
2. Garry Oak	*Quercus garryana*

The Valley Oak is so called because it grows chiefly in valleys. It is the largest of all the western oaks and usually reaches a height of 60 to 75 feet, but occasional specimens become 100 feet high and 30 to 40 inches in diameter. The leaves are deep green, minutely hairy on top and round-lobed, the latter being a characteristic of white oaks. The acorns mature in one season, and are produced in large quantities. In some localities they are fed to swine in lieu of grain.

It is not unusual to find specimens of Valley Oak with huge trunks bearing large, round, and broad crowns, the lower branches of which are often drooping. Its wood is prized highly, for native hardwood timber is scarce on the Pacific Coast.

Next to the Valley Oak, the Garry Oak, commonly known as White Oak, is the largest oak of the Pacific Coast region. The name "Garry Oak" was given to the tree by David Douglas in honor of Nicholas Garry, of the Hudson Bay Company, who furnished valuable assistance to the botanists and other explorers of early times in northwestern America.

This tree reaches its best development in the neighborhood of Puget Sound, where it becomes 50 to 90 feet high, and 18 to 30 inches in diameter. It is sometimes called Western White Oak in contrast with the well-known eastern White Oak. This tree, however, bears more resemblance to our eastern Post Oak than to the white oak, and for this reason has also been named Pacific Post Oak. It may be recognized by its mature leaves which are thick, deep green and shiny. They are from 3½ to 6 inches long and distinctively round-lobed. The twigs are also conspicuously hairy.

This oak is one of the most important hardwoods of the far northwest. The wood is not so good in quality as the eastern white oak, but it is in great demand in the northwest, where few hardwood trees grow. The scarcity of wood suitable for tight cooperage along the Pacific Coast makes this wood in great demand, and the tree will unquestionably be given a prominent place in the future forests of Oregon and adjoining states.

The oak plays a more important part in European history than any other group of trees. The most important of them belong to the White Oak group. In England the oak is looked upon as the monarch of the forest. It is the boast and glory of the whole nation.

A TRIO OF BIG WHITE OAKS STANDING BEFORE THE BRANDY WINE BAPTIST CHURCH NEAR CHADD'S FORD, DELAWARE COUNTY, PENNSYLVANIA. EACH OF THE GIANT TREES IS OV ER 13 FEET IN CIRCUMFERENCE AT BREAST-HIGH.

The Cowthorp Oak in Yorkshire, when measured in 1768, was found to be 40 feet and 6 inches in circumference at 4 feet from the ground. The Bentley Oak, measured in 1759 was 34 feet in circumference 7 feet from the ground. The Boddington Oak that grew in the vale of Glouchester, measured 42 feet in circumference at 3 feet from the ground. Today the oaks of the Windsor forest are famous all over the world. The Spessart oaks of Bavaria in Continental Europe are famous among all the foresters of every civilized land. Some of the trees still standing are estimated to be more than 350 years old and the wood cut from a number of these sylvan giants sold for $575.00 per thousand board feet.

SUBMIT YOUR NOMINATIONS

The By-laws of the American Forestry Association give all of its members the right to participate in the nomination of officers. The Committee on Elections is anxious that this privilege be fully exercised in the forthcoming election. It invites recommendations from the members of the Association in every state as to men well qualified for leadership in the work of the Association, for its guidance in drafting its own nominations. And any nominee endorsed by 25 members of the Association goes on the ballot automatically. The officers of the Association are not to be selected behind closed doors but by the fullest possible participation of all the members of the Association which the Committee on Elections can secure.

We are to elect this winter three Directors for five-year terms, vice Messrs. Drinker, Quincy and Lyman, and another Director for one year to complete the unexpired term of Mr. John Hays Hammond.

We also elect a President, Treasurer, and twenty-one Vice-Presidents for a term of one year.

The Association is facing a period of special responsibility and opportunity, and needs the best thought and active help of its own membership in the election of these officers.

Take a part in it. Send your nominations, either individual nominations or group endorsements, to me or to the Secretary of the Association not later than November first.

W. B. GREELEY,
Chairman.

THE COMMITTEE ON ELECTIONS

The Board of Directors of the American Forestry Association at a meeting in New York City on September 19, appointed the following Committee on Elections: Col. W. B. Greeley, United States Forest Service, Washington, D. C.; Philip W. Ayres, 4 Joy street, Boston, Massachusetts, and R. S. Kellogg, 342 Madison avenue, New York.

STATE FORESTERS IN MINNESOTA

By Ovid M. Butler

Forester, The American Forestry Association

FORESTERS from different parts of the United States and Canada invaded the state of Minnesota in August. The occasion was the third annual gathering of the Association of State Foresters. During practically every daylight hour from August 8 to August 14, the members of the party, which numbered about thirty, were on the move, covering in all some five hundred miles by land and water routes through the northern section of the state. The object of the trip was to acquaint the visiting foresters with some of Minnesota's larger forest problems and to show them on the ground the manner in which the state is conducting its forest work.

Assembling at Bemidji, the party was taken by autos to Itasca State Park and Forest, "the source of the father of waters," for it is there in the small but beautiful Lake Itasca, which the early Indians knew as Lake La Biche (Elk), that our mightiest of rivers has its beginning. Itasca State Park and Forest embraces 32,000 acres, of which 6,000 are water. It was established in 1891 by Congress and the Minnesota legislature to protect the source of the Mississippi River and to preserve a portion of the primeval forest along with its game. Although most of the foresters on the preceding day had traveled from Duluth westward half way across the state, their first view of a real virgin forest was when they came to the protected shores of Lake Itasca. This wooded spot, which is both a game refuge and a protected forest, was the source of diversified interest to the foresters. Here they beheld the Norway pine in its virgin growth and on other portions of the tract, they were able to observe the luxuriant regrowth which under adequate fire protection is following the cutting of the older timber. For, some of the area has been cut over. It appears that when the legislature "grudgingly and only after a bitter struggle," passed the law, creating the park, it refused to appropriate money with which to buy the primeval forest. As a result some of the hills around Lake Itasca itself were stripped of their timber before public sentiment became sufficiently aroused to force the legislature to make adequate provisions for the protection and management of the forests.

THE WOODS, ITASCA STATE FOREST, OWNED BY THE PEOPLE OF MINNESOTA.

After traveling mile after mile through barren cut-over and burned-over pine land—a prairie of scrub growth and charred snags, to which the traveler sought to close his eyes—the effects of forest management and fire protection are most striking as one enters Itasca Forest. It is a tract of wild forest, dotted with more than a hundred lakes. Its every acre of land is producing a crop of timber while at the same time it is the haven and breeding place of deer, mink, muskrat, beaver, porcupine, loon and wild duck. In addition to that, it is rapidy becoming the chief recreational point of the state for summer tourists, being visited every summer by thousands of people, who stay at the great log lodge at the head of Lake Itasca, or camp along the eastern shore where the state has provided camp grounds. Toward the lower end of the lake, the School of Forestry of the state university has its summer camp and nursery. All in all, it is an object lesson in forest protection which any one whose eye has beheld the seemingly limitless stretches of cut-over and fire-pocked land which characterizes much of northern Minnesota, can not fail to take to heart.

From Itasca Forest, the band of foresters, on the following day, visited the Minnesota National Forest, traveling some fifty miles within its boundaries and observing the extent to which the early cuttings made here under Government regulations have been successful. Where fire has been kept out and seed trees left, luxuriant regrowth was everywhere apparent, the Norway pine reproducing itself, with hardwoods coming in prolifically

on the white pine lands. The foresters were especially interested in these cut-over lands for two reasons, first, here were made some of the earliest cuttings on an extensive scale where the lumbermen were required to leave seed trees as natural replanters of the forest, and secondly, it has recently been charged by certain opponents of the forest, who are seeking to have it abolished through political pressure and otherwise, that the government's efforts and methods to bring about natural regeneration has failed. It has also been charged that the artificial planting done by the Government has been a failure. Such representations have been made to members of Congress. After seeing conditions on the ground, there appeared to be no doubt in the minds of the visiting foresters as to the falseness of these charges. The accompanying photographs are typical of what the Forest Service is accomplishing in the way of keeping these sandy lands growing forests.

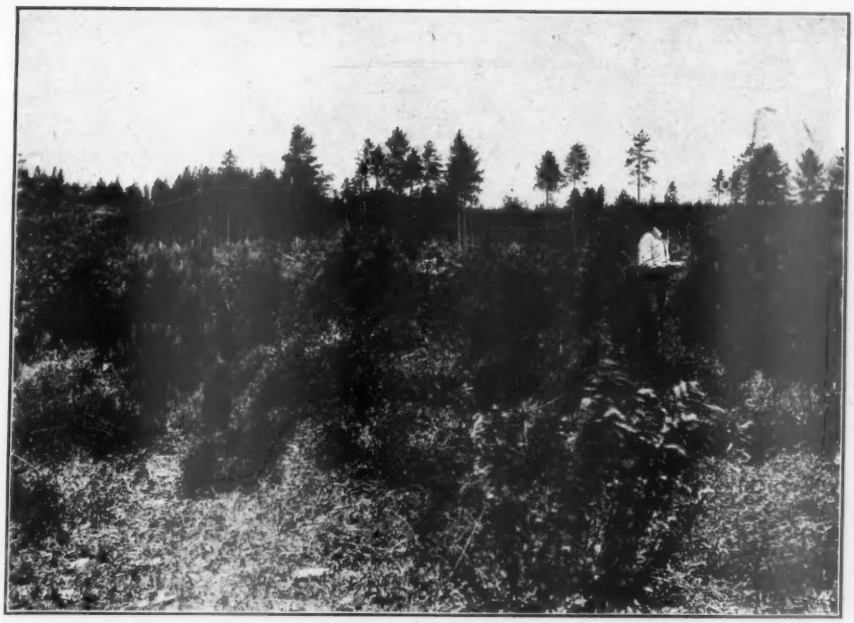
It was not until the completion of their trip, however, and after they had gained some idea of the extent of cut-over and devastated forest land in northern Minnesota, that the foresters grasped in its full significance the value of the Minnesota National Forest to the state and the entire Mississippi valley. With millions of acres of as good and usually much better agricultural land adjacent to the forest going begging, the claim that the land is needed for agriculture appeals to the fair mind as both specious and preposterous in the face of the overwhelming and ever increasing accumulation of cut-over and unimproved land and the rapid and serious shrinkage of forest and recreational areas in Minnesota. The opinion of the state foresters was expressed in a special resolution, which is printed in full in the editorial section of this issue of American Forestry.

THE WONDERLAND TRAIL, MINNESOTA NATIONAL FOREST, WINDS IN AND OUT AMONG THE GIANT NORWAY PINES IN WHAT IS FINE FOREST LAND.

The night of the second day was spent at Lake Winnibegoshish and on the third day the party moved northward by autos and a "special" logging train provided by the International Lumber Company, arriving at International Falls in the evening. An opportunity was thus afforded to pass through the muskeg country of spruce and tamarack, much of which likewise bore the pockmarks of a cut-over and burned-over waste. The striking observation of the day, however, was the fact that where these great stretches of inhospitable land, after being cut over, have escaped fire, a green carpet of spruce, balsam and tamarack is well established.

After a trip through the paper mills of the Ontario and Minnesota Paper Company at International Falls, the foresters left the following day, traveling by boat through the beautiful Rainy Lakes. Arriving at Harding about five o'clock, automobiles transported them the remaining eighty miles to Hibbing, where a midnight banquet, given under the auspices of the Hibbing Commercial Club, awaited them. The next morning a visit was made to the greatest open pit mining district in the world, which only a few years ago was a solid belt of pine timber, much of which was bartered away for fifty cents and a dollar an acre. By noon of the same day the party was in Cloquet, eating dinner under the pines of the state forest experiment station. The afternoon was devoted to observing the work of this station and to visiting the wood-conversion plants of the town. That evening the meeting adjourned at Duluth.

Of the many definite impressions left upon the minds of the visiting foresters, probably the most common was the small amount of merchantable timber and the large extent of cut-over and fire-wrecked land in this northern region of ten thousand lakes. Given back its forests, it will be a land of ten thousand charms—a productive empire yielding lumber, pulp and paper, the labor for many hands, recreation and an abundance of small and large game. But without fire protection, the task of regeneration must continue to grow more and more discouraging. Speaking of the situation in Minnesota, Commissioner William A. L. Bazeley, of the Massachusetts Department of Conservation, and retiring president of the Association of State Foresters, said at the conclusion of the trip:



IT HAS BEEN CHARGED THAT PLANTING ON THE MINNESOTA NATIONAL FOREST IS A FAILURE. THIS AREA WAS PLANTED IN 1900 TO RED AND NORWAY PINE AND IS NOW A FORMIDABLE YOUNG FOREST.

"The last impression is that forestry in northern Minnesota is a task for the state, national government and large timberland owners. The private owners are too few and too poor to be any factor in the situation. Their chief use will be to serve as laborers for the larger interests."

State Forester Edmund Secrest, of Ohio, summed up his observations as follows:

"One who travels through Minnesota's forests for the first time is practically bewildered by the conditions encountered. Three facts are impressive: First, the excessive devastation by fire. Second, the succession of inferior growth following fire and logging, and the absence of reproduction of the white and red pine, which species constituted such a considerable portion of the State's forest wealth. Third, the tremendous responsibility Minnesota faces not only in protection, but in renewal.

"Minnesota has a land classification problem of considerable magnitude, and one which it would seem will call for careful study. One cannot escape the conviction, however, that she will always remain a timber producing state of considerable rank. She is fortunate

"The forest problems of Minnesota, especially fire protection, are so large as to seem almost appalling to a state forester who comes from Massachusetts. In Massachusetts we can get only a partial forest fire protection by the expenditure of $60,000 on an area of 8,000 square miles, while the State of Minnesota is expecting Forester Cox to protect more than five times that area with an appropriation of $175,000. There are favorable aspects to the forest problem in Minnesota, however, chief of which is the ease with which they can get natural reproduction of coniferous trees, especially of Norway and jack pine where circumstances permit, said circumstances being protection from fire and a source for the seed. Except in certain localities there is not that rush to hardwood reproduction on cut-over lands that has to be met in most sections of New England. Where natural seeding is not possible, the conditions for artificial planting are ideal. I was also impressed with the future possibilities of jack pine, especially if allowed to grow on soil site one grade better than that to which it is now largely confined.

FURTHER EVIDENCE OF THRIFTY REPRODUCTION IN AN OPEN STAND OF NORWAY PINE ON THE MINNESOTA NATIONAL FOREST.

in having well established and apparently permanent wood-using industries, and she is in a position geographically to supply highly developed agricultural and industrial states near at hand. This combined with her remarkable scenic and fish and game resources, would make her future seem bright with respect to her forests.

"Minnesota however, must face the problem of forest protection and renewal. She must meet them by giving better support to an efficient Forest Service, under the leadership of Mr. Cox.

"She should convert the state lands into state forests under the administration of the state forest service.

"The State Forester is handicapped in not being provided with forest nurseries. Minnesota needs to do a lot of forest planting, and judging from the successful seed tree experiments observed, regulatory measures in this respect are well worthy of trial.

"But above all Minnesota should prevent forest fires."

The state foresters were a unit in believing that Minnesota should place all of its state forest land under the supervision of the State Board of Forestry and passed a resolution strongly recommending "that the remaining state-owned land be placed under the control of the State Board of Forestry, believing this to be the best land policy not only for Minnesota but for the country as a whole." Minnesota has thus far set aside some 400-000 acres in State Forests which are under the supervision of the state forest service but there remains about 700,000 acres, under control of a board of timber commissioners, from which the state is currently selling off timber and disposing of the land or holding it as cut-over property. Commenting on this policy, C. R. Pettis, superintendent of state forests, New York, said:

DOES THIS LOOK LIKE NATURAL REGENERATION OF NORWAY PINE ON THE MINNESOTA NATIONAL FOREST IS A FAILURE, AS CERTAIN OPPONENTS OF THE FOREST WOULD HAVE CONGRESS BELIEVE? AREA CUT OVER IN 1908-1909, TEN PER CENT OF ORIGINAL STAND LEFT FOR SEED TREES. NOTE ABUNDANT REPRODUCTION.

"Minnesota seems to be a country where by process of elimination and classification lands will be eventually turned into their proper use and held for that purpose. In the meantime, I think their policy is radically wrong.

"We went through very much the same system in New York. A century ago the state was the owner of vast areas of wild mountain and forest land, and they were patented in large and small tracts with the idea of getting rid of the land as quickly as possible and putting a paltry sum of money into the state treasury. A great many people, with the very best of motives and intentions, acquired some of these lands to build baronial estates, etc., and the history of the country is a series of wrecks of life and finance.

"About 1820, a law was passed which provided that these lands which had been patented could be taxed. This placed a burden upon many of these landowners with little income, and on account of the inaccessibility of the timber they were unable to obtain from the property revenue to make it supporting. This led to a kind of lumbering where only at first the white pine was taken off. In those days of much cheap lumber probably this was all they could afford to take out, and then only the choicest parts of the tree which was taken down were removed. After such lumbering oftentimes the lands reverted to the state because no one would pay the taxes on the property.

"The state held these lands as security for the taxes which they had advanced. If the land did not burn over in later years when timber became valuable, some of the lumbermen could go to the state comptroller and pay up the back taxes and get a deed for the land, and they would go in and lumber off the cream of the spruce and then let the land go for taxes again.

"This sort of process continued and was extensively worked until the year 1883 when laws were enacted prohibiting the further sale or redemption of any lands owned by the state in the twelve Adirondack and the four Catskill counties. This law immediately made a forest preserve of substantially 800,000 acres. The land was in the custody of the state comptroller and he did not know what to do with it. In 1884, the legislature made an appropriation of about $5,000 for the use of the state comptroller in appointing a commission to investigate the matter and make a report as to the policy of the state in the handling of these lands. Dr. Charles S. Sargent, of the Arnold Arboritum, was made chairman of this commission and they made a report to the legislature in 1885, and as a result the care and custody of these

lands, together with fire prevention measures, etc., was entrusted to this new department.

"In Minnesota, it would seem to me that the same policy would be pursued as was done by Roosevelt and Pinchot in the National Forests, by setting aside all of the land which the state owns in the forest sections of Minnesota, stopping the sale of their land and timber and waiting for a classification of the area into agricultural or forest types, and then eliminate the larger agricultural areas and set aside permanently the forest areas for forest purposes and have this under the administration of the Forest Service and let the lumbering be pursued under proper silvicultural methods by the state forester."

A SCENE IN THE RAINY LAKES, THE OLD CANOE HIGHWAY OF THE HARDY HUDSON BAY TRAPPERS, AND STILL THE CANOEISTS PARADISE.

Among other resolutions passed by the association was one declaring that the cuttings under the 5 and 10 per cent seed provisions on the Minnesota National Forest are a success and urging the government to complete its payments to the Indians in order that "the public may be protected and the area permanently established as a National Forest and a recreational center for the middle west." Another resolution commended the Milwaukee *Journal* "for the great and conspicuous public service which it is performing in bringing the subject of forestry before the public. New officers elected by the association for the ensuing year are: President, R. Y. Stuart, forest commissioner of Pennsylvania; vice president, F. A. Elliott, state forester of Oregon; secretary-treasurer, Chapin Jones, state forester of Virginia.

AN ANTEDELUVIAN STEED (?) Wide World Photograph

Wrong again. This is simply one of the freaks of nature that we read so much about but see so little of. It is really a tree grown into the approximate shape of a horse. It is located in the woodyard of the Huntington estate at Santa Barbara, California. Mr. Huntington, purchaser of the famous "Blue Boy" painting at $480,000 and which had just arrived at the time this photograph was taken, March 27, 1922.

CORVUS THE CROW

By Edward Howe Forbush

State Ornithologist of Massachusetts

AFTER all, much as we may dislike to admit it, the abused and anathematized Crow is the great American bird. Who sees the American Eagle, and who does not see or hear the Crow? We may find him in the primeval forest or in the heart of the city. In Boston he builds his nest on a street tree in the Back Bay and feeds his young with eggs and fledglings from the nests of pigeons on the State House. You may even see him perched on the gilded dome, cawing raucously to his beloved mate.

Photograph by Arthur A. Allen

THE HUNGRY HORDE

Young Crows are nearly always hungry. Their stomachs resemble a bottomless pit.

'Tis true the Crow has a bad name, and not without reason. To begin with he is black, and that is held against him, although he may not be so black as he is painted. Then he is too smart. As Dr. Cobb says, he knows how to keep out of the way of many a blunderer with a gun, and he is very likely to commit some abominable mischief in the back yard early in the morning before we are up. It irritates us to have this disreputable fowl take such a mean advantage of us, especially as we know that it would not have happened had we been up betimes. The creature is unpopular because he exposes our delinquencies. Then again, according to our standards, he is a thief, for he will take anything edible that he can get his bill or claws on. He immediately reduces it to possession, making it his own, without regard to any prior claim of ownership on our part, and it is extremely difficult to arrest such a cautious and elusive culprit. When it comes to sterner measures, he takes good care of his precious skin. But the Crow has his uses. He destroys many a pest, including the destructive gypsy moth, and, like the red fox, he will be with us always, or so long as any predatory wild creature can survive under the inimical influences of civilization.

The Crow take a prominent part in maintaining the balance of nature. He feeds on the eggs and young of song birds, and even on the parents when he can catch one, but he also destroys mice—the enemies of song birds. He eats white grubs and cutworms and other insect enemies of our crops, but he also takes a part of some of these same crops, and eats some of the other birds that

Photograph by Cordelia J. Stanwood

THE PIRATE

A young Crow just starting out on his piratical career. His shining black coat is the flag he flies.

feed on cutworms, grubs and other crop enemies. If we pursue this subject farther we shall find that it will read a good deal like the story of "The House that Jack Built."

Robins and Crows feed on many of the same insects,

and an increase of Crows is quite sure to be followed by a decrease of Robins, or *vice versa*. Mr. Harrison F. Lewis furnishes some figures which may signify such fluctuations. From May 17 to June 5, 1920, he counted the number of Crows and Robins that he saw daily in the Province of Quebec, and from June 7 to June 27 he did the same in Nova Scotia. The average numbers seen daily were: In Quebec, 18.5 Crows and 12.4 Robins; in Nova Scotia, 12.9 Crows and 41.1 Robins. Here it would seem that a moderate decrease in the number of Crows had resulted in a considerable increase in Robins. Of course, this one example is hardly sufficient to establish a fact, but such a proportion would not be unexpected.

When the behavior of Crows is looked at from our standpoint they appear to do considerable harm. The good that they do is neither seen nor appreciated. It is well to shoot Crows (if we can) when they are doing injury to our property, but it is quite possible to overdo the shooting. To cite but one instance: Some years ago one of my friends who had a large sheep farm found that Crows were killing his young lambs, first pecking out their eyes and then eating more or less of their carcasses. When he had lost about two hundred lambs he offered a bounty of fifty cents a head on any and all crows, although I had advised against it. The neighboring gunners soon very nearly extirpated the Crows from that immediate region. About three years later my friend found that the grass in his pastures was dead, destroyed at the roots by white grubs which had increased rapidly soon after the Crows were extirpated. Possibly some of the dead lambs on which the Crows were seen feeding may have died of disease; others may have been killed by foxes. Probably only a few Crows had contracted the habit of killing lambs, and if my friend had set one good man to watch and kill these few culprits, he might have saved both lambs and pastures.

Photograph by Arthur A. Allen

CROWS HAVE THE "NAME," SO THEY GET THE "GAME"

Known as a thief, he lives up to his name, for the crow will steal and eat almost anything that it can get its bill or claws on.

In the fourth decade of the Eighteenth century the people of all the New England colonies enacted laws for the destruction of Crows and Blackbirds. Heads of these birds were accepted in lieu of taxes in some towns. A bounty on the heads was paid in many. In Truro, on Cape Cod, every married man was required yearly to kill a certain number, and no single man could marry legally until he had turned in his quota of heads. As a result of all this the birds were nearly exterminated, and in 1749 the grass crop was practically destroyed by grubs, grasshoppers, cutworms, etc., so that the farmers had to send to England and the Middle States for hay to feed their cattle and carry them through the winter. The Crow is a tremendous destroyer of grubs and grasshoppers, and while we may have too many Crows, it is possible to have too few.

The Crow has some good qualities. He is an entertaining rascal. To begin with, he is a great mimic. I have heard the most remarkable notes from wild Crows, seeming imitations of Cuckoos and Owls, and a perfect mimicry of the whining of a puppy. A correspondent from New Hampshire reports Crows making sounds like the distant barking of dogs, the squawking of hens, the efforts of a young cockerel trying to crow. Another correspondent saw a Crow hold its head well up, curve the back of the neck and say, *Oh, oh, oh,* slowly, in a tone which might have been given by a "soft-voiced young woman." Another believes that he heard a Crow emit a sound like the "laugh of a loon;" another heard a Crow produce a rattling sound, like the drumming of a Woodpecker, accompanied by violent movements of its head, body and tail. An imitative Crow was seen and heard to "honk like a goose." Last summer I heard one repeating intermittently for an hour in the early morning the syllables *clock'ity clock, clock'ity clock*. All the above calls seem rather unusual, but Crows normally utter a variety of cries.

In the love season some rather melodious notes are given, which perhaps represent the song of the sable bird. Often his antics at this season are ludicrous. The genuflexions and awkward caresses with which he greets his dark inamorata must be seen to be appreciated.

I am not sure that his family ties are always all that they should be, for how can we account for the fact that sometimes three Crows are seen about one nest? This is not an uncommon occurrence in southern New England, and Mr. Frank Novak, of Fairfield, Connecticut, tells me that in 1920 three Crows there were feeding young in one nest. Only last summer the classic shades of the Back Bay in Boston were scandalized by a spectacle of this "eternal triangle." Mr. Harry V. Long, who lives in the neighborhood, says that three birds played up and down Commonwealth avenue with sticks in their beaks for a week or more before they decided just where to build. Often during the building there were two birds in the nest arranging sticks, while the third was an interested spectator on a branch just above it. After the two left, the third dropped into the nest to fix things to

its own satisfaction. All these arrangements went on amicably enough. When short of nesting material two of the Crows pecked tar off a nearby roof and pasted that on the nest, while the other cawed encouragement from the chimney top. When the eggs were deposited one of the birds took up the duties of incubation while the other two came and went. Whether this was bigamy, polygamy or polyandry, deponent saith not.

Young Crows make exceedingly interesting but often troublesome pets. The Indian boys knew this and kept them in their villages. When we adopt an infant Crow into the family we may expect that there will be "something doing" most of the time. To begin with the youngster will clamor for food during the daylight hours unless its wants are supplied immediately. A young Crow's stomach seems to be something like a bottomless pit, and if not continually filled with a great variety of food there is sure to be trouble. In the brief intervals between the "eats," the young Crow is like a child with nothing to do and is almost certain to get into mischief. As soon as it is able to fly well, it is likely to carry off and hide small tools, trinkets or jewels, or to lay them down carefully on the roof or the chimney top. Its depredations are by no means confined to the household of its owner but often extend to neighboring houses, and it may concern itself particularly with the property of visitors.

Photograph by Dr. Arthur Parcher

A CROW MAKES AN INTERESTING PET

Many instances of record prove that he has a decided sense of humor, and he can be taught to talk and mimic with apparent intelligence and, at times, startling effectiveness.

A country grocer making his regular rounds was surprised to find every paper package in his wagon torn open and all the eggs broken. This occurred several times at a particular place. Later he learned that two tame Crows were the culprits. A Crow seemed to delight in stealing its master's pipes and hiding them in the woodpile. Having nothing better to do, it pulled up young plants in the garden beds and laid them all out carefully in order along the rows. Another delighted to peck at the bare legs of the "kiddies." Another frequently could be seen backing a frightened, screaming tot up against a wall while it pecked at the buttons on the child's shoe or at the feet if they were bare. Another stood for long periods at a gap in a board fence waiting for a little fox terrier to come through the opening. Then the expectant bird pecked that frisky pup on the nose, sending it yelping home, and immediately flapped to the top of a grape arbor, where it went into ecstacies over the joke. Sometimes the dog was too quick and got away untouched. On such occasions the ecstacies were omitted. This Crow followed its master while he was digging in the garden. It picked up all the worms that were unearthed and when its mouth was filled it dug a hole and buried the worms, but could not seem to understand why the worms were not there when it returned to the hole with another mouthful. Still another tame Crow, fond of eggs, learned that when a hen cackled she was advertising her wares, and the egg was soon on its travels, with a busy Crow lending it wings.

I find among my notes records of ten tame Crows that have learned to pronounce words, but in each case only a few words were enunciated distinctly. The first one learned to say "Fred" (his master's name), "father, mother," and to call the cows, "Boss, boss, boss, boss." He also learned to drop corn on the ground and then imitate the cock's call to the members of the harem, but when the hens arrived in response to his well-imitated call he picked up the corn and flew away, apparently enjoying the joke. According to Mr. Henry Oldys, the late Nelson R. Wood, taxidermist at the National Museum at Washington, D. C., had two or more Crows at different times which could repeat phrases, one of which was "Come on, Jack." Another Crow at Roxbury, Massachusetts, could cry "Hello, Joe" and could call the cat. During an election he heard the boys cheering their candidate, and soon could "Hurrah for Robinson" with the best of them. This bird learned to laugh "like folks"—"especially after he had done some trick."

A New Hampshire Crow which had learned but one word was accustomed to roost near a sidewalk. It was rather startling to have "Hello" shouted in one's ear, apparently from the empty air, when passing along the

sidewalk in the evening. A New Bedford Crow was beginning to display some conversational ability and had learned to chase the cats off the back fence when he died from eating flies from flypaper. A young Crow that was captured in Portsmouth, New Hampshire, developed a violent and unaccountable antipathy to anything of its own color. While coming home on the train this bird raised an unusual rumpus every time the colored porter came in sight, much to the amusement of the passengers. If a piece of black cloth was dropped in the yard the Crow would make off, scolding as long as the cloth was in sight. This bird learned several phrases such as "Oh, go on!" "Now you did it!" etc. Another Crow, at Hopkinton, made friends with all human companions excepting a boy who clipped its wing. After that the bird would have nothing more to do with that boy. If any one threw water on this bird it made sounds like the profanity of an angry man. Mr. Adelbert Temple writes, however, that it delights in bathing and will pull the plug out of a water pipe to spray water over its feathers. Mr. James Knight, of Amesbury, had a tame Crow. He says that brother Tom sometimes overslept. At such times his honored sire, standing beneath the window, shouted most emphatically, "Tom, get up!" The Crow noticed this and learned to rouse Tom and everyone else in the house at daylight each morning by flapping to the boy's window and repeating the call with great emphasis. One day the boys had a bonfire in the field. Jack, as the Crow was called, had been watching the exciting scene and listening to wild hurrahs; he soon surprised them by hurrahing with the rest. After that, whenever he noticed a cloud of smoke rising from the chimney he saluted it with rousing cheers.

Photograph by Edward Howe Forbush

TAME CROW LOOKING FOR TROUBLE

These birds take peculiar dislikes to certain things. This fellow has a particular antipathy for dogs, one of which he sees in the near distance, so he is preparing for trouble.

When we observe the talent for mimicry and imitation exhibited by young Crows in domestication we cease to wonder that now and then a wild Crow is seen or heard to imitate some unusual sound or to reproduce some noticeable action of another creature. Some Crows have learned to catch fish, possibly from watching sea gulls, as they fly down and snatch the fish from the water in exactly the sea-gull manner. Others resort to gull tactics in order to break open the shells of hard-shelled mollusks, such as sea clams and scallops. They seize the clams in their claws and flying high drop them on the rocks or the hard ground. If the first fall fails to break the shell the clam is taken higher and again dropped, until the shell gives way. Sometimes the strong shell resists until it has been dropped four or five times.

This recalls an old tale of my school days regarding a Crow which chose the bald head of an ancient philosopher as a suitable object on which to drop its hard-shelled tidbit. The mollusk landed on the right spot but proved harder than the skull of the philosopher. The funeral was well attended.

Our black imitator shows considerable intelligence in taking advantage of other creatures. It is not easy for Crows to get shellfish, as clams usually keep well buried in the mud. Years ago, about Puget Sound, hogs were allowed to run at large, and at low tide they worked out upon the flats, where they rooted out common clams, razor clams and other marine animals. Often a Crow might be seen perched between a hog's ears, from which point of vantage it sometimes was able to snatch clam or razor fish from the hog's champing jaws. The Crows there at that time were rarely troubled by the inhabitants, white or red, and were as tame as street sparrows. At times one was seen to alight on the highest point of the "rear elevation" of a bent-over, clam-digging klootchman or squaw, in the hope of seizing some of the results of the digger's patient toil.

A treeless island on the northwestern boundary of the United States was occupied by a colony of gulls and guillemots. There was no wooded island within a mile. Therefore, whenever the natives disturbed the sea birds and drove them from their nests the Crows, which always came from other islands to feast on the eggs of the sea birds at such times, must fly a mile or more to reach the spot. Those on the nearest islands arrived first, followed by those from more distant points. One pair of Crows stole a march on their brethren by digging a hole in the ground on top of the gull island and building a nest in this hole, like that of a song sparrow in a ditch bank. Whenever any disturbance arose these Crows and their young always had first chance at the eggs and young of the sea

birds until I arrived on the scene and stopped their nefarious operations. This is almost the only instance on record of Crows nesting on the ground. The reason for such nesting in this case was plain.

Crows are clannish creatures. They will help each other, but that is as far as their altruism extends. To the rest of the world they are Ishmaelites. Every man's hand is against them, and many wild creatures seem to fear them, but they are kind to each other. Not long ago a Crow, perhaps too enthusiastic in his fishing, fell into the Merrimack River. His plumage was soon soaked, and he was carried along in the flood, unable to rise from the chilling waters, but his cries brought assistance. A flock gathered cawing overhead. Suddenly one flapped down to the surface, seized the drowning comrade and laboriously bore him a short distance toward the shore. As the strength of the first rescuer failed, the soggy bird was relinquished to another, and so one after another seized and carried landward their unfortunate comrade until he reached the shore. There he spread out his soaked pinions in a sunny spot and dried them, when all flew happily away to the woods. How rarely does similarly effective and speedy human aid reach a drowning person. The well-known propensity of the Crow to come to the aid of a stricken comrade seems to be recognized by Eagles, Hawks and Owls, and so active, healthy Crows rarely are attacked, even by Owls, except at night,

Photograph by Arthur A. Allen

THE STRUGGLE TO SURVIVE

In winter the crows take what they can get. Nothing edible comes amiss during this lean season.

when sight seems to fail them and they cannot combine in defense. Crows in winter gather from far and near to roost at night in some favorite wood. Such roosting places sometimes are visited by many thousands. In the darkness of night the Horned Owl comes to these roosts and takes his pick of the slumbering inmates. Noiselessly he swoops and strikes, there is a brief chorus of startled caws, and the great Owl bears his bloody victim to some snowbank and picks its bones. Its companions then are helpless to avenge its fall, but woe to that midnight assassin if they catch him out after daylight. His cue now is to hunt some deep, dark cavity in a hollow tree and "pull the hole in after him," else those Crows may make life miserable for him for the rest of the day. They will surround and envelop him in harsh and almost incessant clamor. Hundreds of his noisy bodyguard will escort him wherever he goes, and some of the bolder ones may even come to blows with him. There is no more sleep for the evil one that day unless he can find some secure hiding place.

Crows do not hesitate when in numbers to attack the boldest Hawks, and even the lordly Eagle is persecuted

Photograph by Arthur A. Allen

A STUDY IN BLACK AND WHITE

The first sign of food on the newly fallen snow attracts a hungry flock of shiny, black crows.

by them. Sometimes, however, a lone Crow, becoming unduly impudent, attacks a Hawk single-handed, and right there he makes a great mistake. Once I saw a Crow badgering a little Sharp-shinned Hawk. The Hawk fled for a short distance, then turned on the Crow, and that Crow was fortunate to escape. Crows will mob and follow a fox for hours, giving him no peace, until at last, tired of "fuss and feathers," he retires to some secluded retreat. Mobs of Crows sometimes attack and kill birds or animals too large for a single Crow to cope with. Thus full-grown rabbits, grouse and pheasants are sometimes killed.

A wounded or dead Crow often becomes the focus for a gathering of all the Crows in the immediate region. To the Crow wake they come from near and far in noisy convocation, and after a long time, having made noise enough to "wake the dead," they disperse more or less quietly.

When the fall migrations begin there are certain gathering places where thousands come together in noisy conclave. The farmers call these gatherings Crow conventions. "Cawcusses" would be a more descriptive word.

(Continued on Page 612)

PUBLICITY IN STATE FORESTRY WORK

By Henry C. Campbell

Assistant Editor of the Milwaukee Journal and Chairman of the Wisconsin Forestry Association.

THE chief foe of forestry is ignorance. Hardly anybody is opposed in principle to forestry. Progress is retarded not by direct opposition, but by the indifference of the many who do not know, do not understand. Our improvidence, which resulted in laying waste our great forests without any plan or policy looking to the creation of new forests, arose very largely from ignorance. Even today, when the economic shoe pinches painfully, ignorance of forestry, ignorance of the need for forestry, ignorance of the achievements of forestry in other countries, is still all too widespread.

There is only one way to dissipate widespread ignorance, and that is by widespread publicity. It is imperative that the truth be dinned into the minds of the people. The practicability of forestry, the urgent, absolute duty of creating new forests and the danger to our civilization of neglecting forestry, all these are things that the public must be made to understand.

PELICAN LAKE

The campaign carried on in Wisconsin by the author has created state-wide interest in the great outdoors.

We must realize that no adequate forestry policy can be adopted and maintained in our country or in any of our states unless it is supported by a strong and enlightened public sentiment. To arouse this sentiment to a point where it will be irresistible we must depend upon publicity—that is, the printed word. In short, publicity of the right kind must be the basis of all efforts to make the practice of forestry no less persistent and systematic and continuous than the growing of wheat or the growing of potatoes.

No man can write effectively in the cause of forestry unless he possesses reasonable knowledge of the subject, good judgment, some imagination, no little force, ability to state things clearly and the gift of making pictures out of facts. No writer who cannot interest and convince his average fellow-citizen can render real service to the cause of forestry. He may write countless articles, even large tomes, and yet not make the slightest dent in the popular mind. Briefly stated, the prime requisites are reasonable knowledge of the principles of forestry and a trenchant, graphic pen. I feel that I am within the truth when I say that foresters who possess the power of writing in a way that appeals to the popular mind are not many. Certainly, I am within the truth when I say that professional writers who do possess the power of appealing to the popular mind and possess, in addition, a working knowledge of forestry, are still fewer in number.

Without the slightest desire or intention to criticise foresters for not being able to write more effectively, or to criticise publicists for not knowing much more than they do about forestry, it nevertheless seems very plain to me that the one great reason why the cause of forestry has lagged is that this power that comes from knowledge combined with effective writing has been limited to a very small number of individuals.

The methods of publicity which The Milwaukee Journal, a consistent advocate of forestry for twelve years and longer, has adopted in order to arouse proper interest in state forestry are somewhat different from any other

plan that has come to my attention and perhaps it is for this reason that it has attracted considerable attention in forestry circles, especially in forestry schools. An outline of these may be timely. The Journal's plan is based largely on man's natural love of trees. It aims to strengthen and crystallize this feeling. It advocates close care of shade trees in cities and the planting of native trees along the country highways. It urges the establishment of community and county and state parks in regions of virgin timber and lakes and streams. It preaches the doctrine of community forests. It emphasizes the necessity of planting trees along the shores of Wisconsin's lakes and rivers, shores now bare to the extent of hundreds of miles. More than all else, however, it points out the need for a broad, comprehensive system of state forestry. It does not hesitate to assert that there are fully three million acres of non-farming land in Wisconsin and that the state should buy this land and reforest it. It steadily calls attention to the relation of these enterprises to one another and of all of them to the development of the tourist trade, to drawing dividends from a state highways system that has cost the taxpayers many millions of dollars, and to the importance of forest growth in fostering fishing and hunting. The chief goal in view is always the practice of state forestry on an adequate scale. All these other things are urged, not only because they are valuable in themselves, but because they are essential to the progress of forestry. It is forestry, state forestry, that constitutes the backbone of the program.

WOLF RIVER DELLS

It is for the preservation of such beauty spots as this that the author is so ably arousing sentiment in Wisconsin.

To this program, which is nothing more nor less than a plan for the utmost development of the natural resources of Wisconsin, The Journal devotes considerably more than a column a day, on an average. Once a week all these articles are printed in a bulletin the size of an eight-column newspaper page and these bulletins are sent to every newspaper in the state, to all the women's clubs, to community advancement associations and chambers of commerce, to Rotary and Kiwanis clubs and the like and to the rod and gun clubs of the state. This means that forestry literature reaches every community in the state every week. Among organizations of men and among women's clubs it has stimulated interest in forestry and in other features of what may be called a constructive out-of-door program.

After everything is said and considered, however, the chief feature of this plan, the chief value of it, is in arousing the interest of the state press, and thus spreading the gospel of forestry in every nook and corner. For going, as it does from one newspaper to other newspapers, it receives a warm welcome from the average editor. This is the new idea that the plan embodies. Speaking generally, the editors of Wisconsin realize that The Journal is working in an earnest and unselfish manner to advance the interests of the state. They are asked to cooperate in this work, not only in the interest of the state, but in the interest of their community and of themselves, and the result is that to the extent of many columns The Journal's articles on forestry and allied subjects are reprinted in the state papers every week. There is being built up in Wisconsin, as a consequence, a sentiment in favor of state forestry which, in my opinion, will be irresistible. It was this sentiment, already partly aroused, which induced the last state legislature to initiate a constitutional amendment designed to give the state full power to engage in growing timber as a business. It will be necessary for the next legislature to approve the measure. I have no doubt that it will do this. Nor is there any doubt in my mind that the people will ratify the amendment when it is submitted to them at the polls. Then the decks will have been cleared for definite action.

In several other ways which have proven effective The Journal is engaged in promoting the cause of forestry in particular and its out-of-door program in general. Some eighteen months ago it prepared, printed and distributed in widespread fashion, free of charge, a booklet entitled "Put Idle Acres to Work." This contained a state forestry program which it formulated, articles advocating forestry and written for it by Col. W. B. Greeley, chief of the United States forestry service; Charles Lathrop Pack, president of the American Forestry Association;

P. S. Lovejoy, Enos A. Mills, William T. Cox, state forester of Minnesota; Marcus Schaaf, state forester of Michigan; C. L. Harrington, forestery member of the Wisconsin Conservaion Commission; P. S. Ridsdale, editor of the American Forestry magazine, and others. A notable feature of the booklet consisted in the recommendations in favor of forestry which Carl Schurz made while he was secretary of the interior during 1877-80, messages which at that early period sounded a clear warning that if an adequate policy of protecting our timber, as older countries were doing, were not adopted in time, the result would be the deplorable conditions that we face today. Another noteworthy article in the booklet consisted of quotations from an article written in 1855 by Increase Allen Lapham, father of the federal weather bureau, in which he set forth cogent arguments in favor of the adoption of a sound forestry policy. In 1867 Mr. Lapham was made chairman of a state forestry commission, created by the Legislature of Wisconsin, with the result that a report of 100 pages "On the Disastrous Effects of the Destruction of Forest Trees Now Going on so Rapidly in Wisconsin," was submitted to the lawmakers. A synopsis of a survey of Wisconsin's forests made in 1898 by Dr. Filibert Roth, dean of western foresters, found a conspicuous place in the booklet. Thus this publication pointed out the lessons of the past and outlined the policies that should be carried out in the future.

The Journal has used the cinema to promote the cause of forestry. During 1921 it engaged a high-class photographer, who is a lover of Nature as well, to take motion pictures of the most striking and beautiful spots in the state. These constitute two reels. They have been shown in scores and scores of communities. As a rule, some member of the staff, conversant with the subject, explains these pictures and their relation to the chief features of the Wisconsin program. A printed folder describing the pictures is distributed and two pages of this are devoted to the presentation in clear, simple language, of Wisconsin's great opportunities in regard to things that lie out of doors and of the reasons and advantages of working actively and earnestly to these ends. Of course, state forestry is emphasized.

For years the Journal has maintained a bureau designed to aid motor tourists and this has won the reputation throughout the country of being a model of its kind. It inspects 8,000 miles of Wisconsin highways every year and constantly collects the latest and most reliable information regarding the condition of the principal state and county roads. Motorists get all this information by merely asking for it and not only tours through the state by residents and by visitors from far away points are directed by the bureau, but tours through Michigan, Minnesota and every other section of our country and of Canada. This bureau publishes The Call of the Open Road, a guide book for motorists in Wisconsin, with a general road map and many sectional road maps, with road indexes and directions for going from any important point in the state to any other. One page of this guide book is devoted to setting forth both in brief and in detail the Wisconsin out-of-doors program, particularly state forestry. Although a small charge is made for this guide book, 60,000 copies of it have been printed this year and nearly all of them are in the hands of tourists—are, in fact, their constant companions. This means intensive forestry publicity spread quite far.

In connection with this motor travel bureau there has been organized this year, with 10,000 members already in Wisconsin, Illinois, Michigan and other states, The Journal Tour Club. Every member of the club possesses a copy of The Call of the Open Road, with its urgent appeal in the interest of state forestry, and, in addition, pledges himself, in his membership card, to these things among others:

"I will do all in my power to preserve and perpetuate our scenic and natural beauties and to promote state forestry.

"I pledge myself to be careful about starting and extinguishing camp fires and to induce others to help protect our forests against fire."

I earnestly hope that the spirit in which I have set forth The Journal's plans and efforts in the interest of forestry will not be misunderstood. It is impossible for me to express specific views on the subject of forestry publicity without citing these examples and in doing this my purpose is merely to be as helpful as possible. Some of the ideas which we are carrying out are original and they have worked out so well in Wisconsin that they may prove of value in other states. We who believe in forestry cannot be too alert, too enterprising, too quick to profit by one another's experiences.

On one point, apart from publicity, but vital to state forestry, pray let me presume to make a suggestion. I realize, perhaps as clearly as almost any other layman, the trials and tribulations which state foresters have suffered from the beginning. Just as I believe in their ideals, so I sympathize with them in their disappointments, setbacks and heart-burnings of the past and present. In view of their unfortunate experiences, it is little wonder that they have felt depressed and discouraged. But if I am in any way a judge of the public mind, times have changed greatly for the better; there is a new, fine spirit in the land and a better day and a real opportunity for achievement are at hand. In every state, however, the cause needs leadership, forceful, determined, constructive leadership. In each state the state forester is the logical leader. I hope that he, forgetting the gloomy past, will realize that the present is cheering and the future bright indeed. Let him take heart and "buck up." The time to do big things is near. The glory of doing them—shall it pass from him and go to another?

EDITORIAL

A MESSAGE FROM THE PRESS

SPEAKING at a banquet in honor of the Association of State Foresters by the commercial club of Hibbing, Minnesota, a few weeks ago, Henry C. Campbell, Assistant Editor of the Milwaukee Journal, said:

> "If I am in any way a judge of the public mind, times have changed greatly for the better. There is a new fine spirit in the land, and a better day and a real opportunity for achievement are at hand. In every state, however, the cause of forestry needs leadership—forceful, determined, constructive leadership. In every state, the state forester is the logical leader. I hope that he, forgetting the gloomy past, will realize that the present is cheering, and the future is bright indeed. Let him take heart and buck up. The time to do big things is near. The glory of doing them! Shall it pass from one and go to another?"

These words convey a timely and heartening message not only to state foresters but to foresters generally. Disappointed and often discouraged at the seeming slowness with which the public embraces forestry, the average forester has had to struggle against a natural drift towards passiveness—a state of mind which holds him self-centered upon his own particular tasks and not only satisfied but preferring to be thus restricted in his efforts. He has had to fight against an influence which tends to dull his vision and to dampen his enthusiasm. Too often he has retired into a sort of technical shell and fallen apart from the slow current instead of persistently doing his shift at the front to help widen the channel for a larger, stronger and swifter current of public opinion.

It is a dull forester, indeed, who does not recognize that the success of his profession depends upon public understanding, public sympathy, public confidence. Ignorance, as Mr. Campbell says, is the chief foe of forestry. No longer is the need of forestry a disreputable issue. The great obstacle is public ignorance of that need. The great task is to enlighten the public. Even now, it means years of hard and persistent work on the part of those competent to present forest subjects in their true importance and in their true perspective. Road side planting, tree surgery and the like are legitimate pursuits but unless wisely handled in an educational way, they are apt to give the public a misconception of the real economic vitality of forestry. And misconceptions are usually more difficult to correct than plain ignorance.

After all, it is the foresters who, having studied our forest problems in their entirety, have the knowledge which the public needs and wants. The press is the first to feel the public pulse. Mr. Campbell knows whereof he speaks when he says there is a new spirit in the land. It is the almost universal spirit of interest in forestry which one encounters nowadays wherever he goes. The call is for leadership—the leadership of those who understand the country's forest needs. Do foresters fully recognize their opportunity—yes, their responsibility. Every forester can be a leader in telling the public the story of his work and he can do it without interfering one whit with his technical pursuits.

Mr. Campbell says that one difficulty about forest publicity is that the foresters who possess the power of writing in a way that appeals to the popular mind are too few while professional writers with the art of popular appeal and in addition a working knowledge of forestry are still fewer in number. So far as foresters are concerned, the explanation probably is that they have not made an effort to develop the art of writing for the public. There is no good reason why they should not be interesting writers. They are engaged in a work which, for its public appeal and diversity of interests is unexcelled. The actual and potential sentiment for constructive forest action in the country today represents an unlimited force. It invites leadership. With a pen and a camera, every forester can, and should, be a leader. And he will find that with few exceptions, the press is his ally and his medium.

But the forester who waits on public sentiment is a follower. He is not giving his cause or his profession the best that is in him. He is letting the other fellows blaze the way.

REFORESTATION IN THE MINNESOTA NATIONAL FOREST A SUCCESS

CHARGES that reforestation by the Government of pine lands in the Minnesota National Forest has been a failure, are clearly discredited by the Association of State Foresters, whose members recently met at Itasca Park, and, as a part of their meeting, visited the Minnesota Forest to examine conditions on the ground. The party numbered some twenty-five or thirty foresters from different parts of the United States and Canada, and upon completion of their trip they passed the following resolution:

"WHEREAS, the members of the Association of State Foresters, on their recent trip through northern Minnesota, traversed over fifty miles within the Minnesota National Forest and are agreed that upon the lands cut over under the five and ten per cent seed tree provisions of the laws of 1902 and 1908 the reproduction of Norway pine is abundant, a second growth is assured, and the experiment is a success, and

"WHEREAS, the reservation of the ten sections and the islands in Cass Lake and the protection from fire by proper burning of the slash and by the maintenance of fire-patrol by the U. S. Forest Service have resulted in establishing the reputation of the Minnesota National Forest as a recreational area of national importance, serving a vast population in the Mississippi valley and adjoining states, and

"WHEREAS, the permanent status of this great public reservation and park still awaits a final settlement under which the Indians whose lands and timber were ceded to the United States, are to be paid for these lands and for the timber reserved as seed trees and as park areas,

"BE IT RESOLVED, That the Association of State Foresters considers that the early completion of outstanding timber contracts and the valuation of and payment for this property by the Federal Government is a mattter of utmost public importance in order that the welfare and interests of both the Indians and the public may be protected and the area permanently established as a National Forest and a recreational center for the middle west."

When a group of thirty experienced foresters come to the conclusions contained in the resolution just quoted, one cannot refrain from wondering if the foundations for many of the other charges which have been brought against this forest, are equally fallacious. All in all, the evidence brought forth ought to be abundantly adequate to put the fair minded citizen on his guard against the representation which opponents of the forest are making to Congress, in their efforts to abolish the Forest and thus open it up for real estate barter.

THE MOVE TO STANDARDIZE LUMBER

LUMBER, it has been said, is simply lumber. It is not sold; it is just bought and no one who buys it knows much about it anyway. The ordinary housebuilder, when it comes to the question of grades and values of lumber is lost.

To all of which the average American will heartily agree. The situation is unfortunate. It is not good for the consumer, it is bad for the industry and it is a heavy handicap to economical utilization of our declining supply of standing timber. For years, much has been said and much written about the need of clarifying the lumber trade, but it has been during only the last year that the lumbermen have made a definite move of real constructive promise in that direction.

Under the rather lugubriously sounding term of "simplification and equalization of lumber and lumber grades," the lumber industry has taken the task upon its own shoulders and has assumed the responsibility of carrying it through to a successful conclusion. As a prominent lumberman recently said: "The lumber industry is on trial here and we have got to make good." The public should not only follow this movement with close interest; it should lend to it the heartiest support and cooperation because it goes directly to the elimination of waste in wood and money and to the more complete utilization of our raw wood supply.

Briefly and simply stated, the immediate object is to weld the present multiplicity of lumber grades, sizes and standards into a more or less common code, based upon a more scientific conversion of the standing tree into parts which will best adapt themselves to consumers' requirements; in short, to standardize lumber and the lumber trade. The ultimate possibilities of the movement are not known. If successfully carried out, there can be no doubt but that it will be a large factor in conserving our raw wood supply and thus putting off the day of a timber shortage; in simplifying the lumber trade and stabilizing the industry as a whole; in protecting the consumer against lumber jugglery and other sharp practices; in eliminating some of the wastes incidental to lumber distribution and in arousing the wood user to the urgency of more economical utilization.

Although involving simplification, the problem is anything but a simple one. There are lumber grades, lumber sizes, lumber patterns ad infinitum. Among the softwoods, almost every species has its own set of grade and manufacturing standards. The variety of uses to which the more important woods are put is staggering. Custom is of long standing and tenacious. To bring simple and definite standards out of the present diversity of form and use will tax the sincerity and ability of the industry to the limit. Unfortunately, the industry, itself, is not wholly united on the project. There are lumbermen who oppose it in one respect or another on this or that ground. These are some of the obstacles which will make accomplishment a stronger force than otherwise in winning public confidence.

Neither is the project one which may be accomplished in a day or a week. It can never be solved properly merely by representatives of the industries or experts in their particular lines getting around a table and compromising on standards because they think there will be some improvement. Meetings and conferences are, of course, essential, but the stability of business is too important to make fundamental changes unless it is well established that the changes will be beneficial. Stand-

ardization of lumber and conversion practice must be based upon scientific studies of the different woods and their conversion and application to different uses. Here is a great field of almost limitless possibilities. But such studies will cost money. They must be done by unbiased investigators. And they must be sufficiently thorough clearly to indicate the advantages of the changes proposed. From the publicity emanating from lumber sources, it is assumed that the lumbermen are prepared to measure up to the job.

Certainly, it is only on the basis indicated above that the public interests will be fully and fairly served, while failure on the part of the lumber industry to thus carry through the project will injure the industry in its public esteem quite as much as it will set back the progress of the whole movement.

NATIONAL FORESTS AND SURPLUS MILITARY RESERVATIONS

WHAT should be done with the one hundred or more army training areas which the Federal Government acquired during the war in the central and eastern states? These reservations range in size from a few hundred acres to more than one hundred thousand acres. With our armed forces now reduced to five per cent of their wartime strength, we have on our hands a large area, in the aggregate, of surplus military reservations, in which every citizen has a direct interest but of which few have much knowledge. It is well to bear in mind, therefore, that in time of war, these reservations are chiefly valuable for military purposes and that in times of peace, many—and perhaps most—of them are chiefly valuable for growing forests.

These areas were bought under war pressure and at war prices. In some cases the Government paid $60 and more an acre for land which today or in the reasonably near future will not bring anything like that price. They are not well situated or well adapted to private agriculture, industrial development or for homes. This is a statement of fact and not a criticism. Their importance in preparing the armies of America for service abroad and at home could not then and cannot now be expressed in dollars and cents. But put upon the block today and knocked down to the highest bidder, there is no chance for the tax payer to get even a fraction of his money back.

Many of these reservations are not immediately needed for military purposes. All may hope that never again will America be called upon to raise and train great armies for war. But hope blind to possibilities is foolish and dangerous. If, in ten, twenty or thirty years we should be brought sharply up against a crisis such as that of 1917, again might we need one hundred or more suitable areas where men from the fields and factories could be quickly and properly trained to national defense. If again we should have to buy these areas in the open market, the expense of the previous operation would be duplicated—and probably doubled. Now that we have them, instead of sacrificing them at a great financial loss, the wisest course appears to be to declare them National Forests, subject to military needs.

For forestry offers the solution. Many of these reservations are partly forested and are more suited for forest purposes than for any other use. Joint examinations of Camp Benning, Camp Humphries, Camp Meade and others by military and forest officers have disclosed that the dual use of the areas for military and forest purposes is not only practicable but highly desirable. Protected from fire and trespass, and put under sound forest management, these reservations will contribute to local development and progress and should in time pay the Government a return on the investment.

This is particularly true of the areas in the southern pine belt where the rapid growing loblolly can be brought to early maturity for saw-timber, and where slash and long-leaf pine forests can be turpentined at 25 to 30 years. The realization of an income from these lands would be further beneficial in that it is proposed to devote 35 per cent of gross receipts to local road and trail construction. Furthermore, the local population would find new opportunities for profitable employment.

Properly handled as National Forests, they will serve their most useful and profitable peace-time purposes—as timber producing properties, as demonstration forests where the most approved methods of forest practice can be seen, as public recreation areas, and as upbuilders of local communities. More than that, they will pay their way, and, in years to come, they will return to the people of the United States their wartime cost.

DIRECTORS RESIGN

At a meeting of the Board of Directors of the American Forestry Association at New York City September 19, Dr. Henry S. Drinker, who has been a director for twelve years, resigned as director. The resignation was accepted with regret, as were the resignations of Mr. Charles F. Quincy, who has also served for many years, and of Mr. John Hays Hammond, who has been a director for three years.

TWIN TREES AND NATURAL GRAFTS

By E. F. Andrews

(WITH PHOTOGRAPHS BY THE AUTHOR)

THE twin oak and elm tree of which a picture was given in the November, 1921, number of AMERICAN FORESTRY, attracted a great deal of interest. Such natural grafts are much more common than is generally supposed. In fact, woody stems of almost any kind, if kept in close and continuous contact while young, will coalesce and form a twin, or composite stem. Altogether, I have observed unions more or less complete between the following species: Willow oak and loblolly pine, white oak and tulip tree, white oak and shortleaf pine, red oak and hickory, red oak and maple, river birch and hackberry, beech and white pine, sweet gum and loblolly pine, sycamore and hackberry, hackberry and black locust, elm and haw (*C. spathulata*), sweet gum and tulip tree, and the loblolly and shortleaf pine.

Twins of this kind can be produced only when the germinating seeds are in such close proximity that the stems of the seedlings, as they increase in size, are forced by mutual pressure to grow together on their contiguous sides. Unions less perfect, sometimes occur as root grafts, when seeds dropped by birds or by the wind lodge in crevices of the root of a growing tree and germinate there. Haws and pines, the seeds of which furnish so large a part of the food of birds in winter are of frequent occurrence as root grafts. And when we consider the vast number of seeds scattered over the ground by trees of all kinds, and tumbled about by wind and water, buried by rodents, or dropped by birds and other

Fig. 1.—Twin white oak and short-leaf pine, near Rome, Georgia.

Fig. 2.—Rootgraft between elm (Left) and haw (Right) near Rome, Georgia.

Fig. 3.—Root and stem graft, sycamore and hackberry, Dayton, Tennessee.

Fig. 4.—Stump of twin tulip tree and white oak, Ashland Farm, Walker county, Georgia.

animals, the chance that those of different species may happen to be brought together is not so remote as might be supposed.

The most remarkable instance of this kind that I have met with was that of a white oak and a tulip tree at the foot of Lookout Mountain, in Walker, County, Georgia. It stood beside a public road that passed through Ashland Farm, the beautiful country home of Mr. Z. C. Patten, of Chattanooga, and was widely known throughout the neighborhood as the Twin Tree. The stems were completely amalgamated to the height of 9 feet and their girth measured 17 feet, breast high. The portion of the circumference occupied by the oak was 11 feet and the tulip tree filled out the remaining 6 feet. Unfortunately

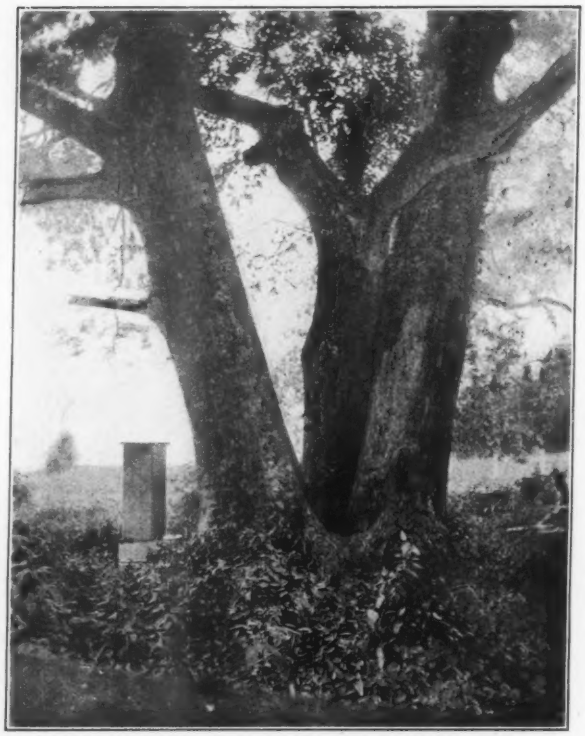


Fig. 5.—Root colony of swamp post oak (*Q. lyrata*), Washington, Georgia. The diameter of the individuals composing it averages about 2 feet.

I was not prepared for taking a photograph when this interesting specimen first came under my notice, and on my next visit, ten years later, found that it had been blown down by a storm some years before, and the trunk cut to pieces and carted away. Only the stump remained, reduced now to the hollow ring of wood and bark shown in the photograph (Fig. 4). It was easily recognized by the shape and size of the stump, and the line of union between the two stems was distinctly shown by the difference in the bark and the graining of the dead wood.

Twins of the same species are more common than those of alien stocks, since seeds of the same kind are more likely to be deposited together, but they attract less attention, being mis-

Fig. 6.—"Identical twin," Spanish oak (*Q digitata*) 9 feet in girth just below the fork. Near Rome, Georgia. View facing the line of union.

Fig. 7.—Another view of 5, at right angles to the line of union, showing the protrusion or bulge on opposite sides of the common trunk.

Fig. 8.—A vertical fork. Notice the absence of the suture, and the round cylindrical trunk, while that of the true twins is more or less oval in outline.

taken by inexperienced observers for upright forks. These "identical twins," to borrow a term from the medical profession, for the sake of distinction, differ from those just described in being of the same age and parentage, and the two forks into which they sooner or later diverge are generally of the same size and vigor, while in the "mixed twins" of different stocks, they vary according to the relative ages and growth rate of the parent species.

Twin and composite stems of various kinds arealso often produced by the union of root sprouts that spring up around the stumps of dead trees, or if the stump is too large for the growing sprouts to be brought into con stact, a root colony, such as that shown in the illustration, (Fig 5), may result. And sometimes, when the main axis of a seedling is broken at an early stage of growth, the two strongest branches remaining are apt to take an upright direction, thus simulating a twin or a double stem so closely that it is not easy to distinguish between them. In general, the true twins are distinguished by a suture which follows their line of union down to or near to the ground (Fig. 1), or in some cases, by a protrusion on opposite sides of the common trunk (Fig. 7), as if the coalescing stems had been forced by their increasing size to bulge out at right angles to the line of pressure.

THE FUTURE OF THE AMERICAN LUMBER SUPPLY

By A. B. Recknagel

[Professor of Forest Management and Utilization, Cornell University]

THE subject of the future of the American Lumber Supply is a large subject and can best be approached by a study of the past developments of the industry, its present resources and then, predicated upon these two. a look into the future may be ventured.

In 1850 the United States produced five billion board feet of lumber with New York leading, Pennsylvania second, Maine third, Ohio fourth, Indiana fifth and Michigan sixth.

In 1860 the total production was eight billion feet. Pennsylvania led with New York, Michigan, Maine, Ohio, Indiana and Wisconsin following in the order named.

In 1870 the production had risen to 12,755,000,000 feet and Michigan topped the list with Pennsylvania, New York, Wisconsin, Indiana, Maine, Ohio and Missouri next in rank. The center of production definitely passed in this decade to the Lake States where it remained for thirty years. Michigan led the other states of the Union from 1870 till 1900 when Wisconsin took the lead till 1905.

About 1895 began the rise of Louisiana, Mississippi and the other Southern States in the list of lumber producers. Thus Louisiana was third in 1895, second in 1910 and first in 1914. The Southern Pine region overtopped the Lake States in 1900 and was pre-eminent until 1920 when for the first time the State of Oregon displaced Louisiana from second rank. Southern pine may be expected to recover part of the lost ground in the next few years, but the indications are that the supremacy in lumber production is moving to the West.

The shifting of the lumber production center from the south to the west coast began with the rise of the State of Washington to a leading place. Since 1905, with the single exception of the year 1914, the State of Washington has held supremacy as a lumber producer. Today (1920) out of a total cut of 33,798,800,000 board feet, the order of the first twelve states is: Washington, Oregon, Louisiana, Mississippi, California, Arkansas, Alabama, Texas, North Carolina, Wisconsin, Virginia and Florida. All the rest produce less than a billion feet yearly.

The curve of lumber production from 1904 on indicates a steady diminution since 1912 and a high point in 1906 and 1907. In 1919 the cut was 34,552,076,000 board feet and in 1920 the cut was 33,798,800,000 board feet. The cut for 1921 has not yet been computed.

The statistics compiled by the United States Forest Service in 1920 show that the standing saw-timber in the United States aggregates 2,214,893,000,000 board feet of which nearly half or 1,141,031,000,000 board feet are on the Pacific Coast and of this half nearly one half or 558,571,000,000 feet is Douglas fir.

In all the Eastern States there are only 850,721,000,000 board feet and in the Rocky Mountains 223,141,000,000 board feet.

The Pacific Coast in the saddle and Douglas fir alone could support the present cut of 7,000,000,000 feet of that species for 80 years were it not for the inevitable increase of the amount cut due to failing supplies of other species. A drop in the production since 1919 of 15 per cent in yellow pine, 13 per cent in white pine, and 16 per cent in spruce, indicates the drain there will be on the remaining supply of Douglas fir.

Ultimately the question is not—where is the most of the remaining virgin timber—but where is the most productive forest area? as the American Forestry Association points out. When our virgin timber is gone we will have to "grow our own" since it is obviously out of the question to depend upon foreign sources of supply. The situation in this respect reveals a present forest area of 463,461,000 acres in the United States (excluding Alaska) which figures out 4.32 acres of forest land for each inhabitant.

Of the present forest area the South Atlantic and East Gulf States have 99,000,000 acres; the lower Mississippi States 78,865,000 acres, and the Pacific Coast States 62,586,000 acres. Not all of this is productive now, in fact little more than half now bears saw-timber, but it is reasonable to expect that at least half of it can be made productive in the future.

If, then, 250,000,000 acres of forest were producing 200 board feet yearly we would have fifty billion feet annually, enough to meet our prospective requirements for both domestic use and export.

This is the thing to do—now, while we still have 2,200 billion board feet of merchantable timber, sufficient to support a yearly cut of 40 billion feet for 55 years, make effective a national forest policy which will safeguard the future of the American Lumber Supply.

To go into the details of such a forest policy would carry one far afield. Various measures have been proposed and fully discussed in the various lumber trade journals. The essential thing to do is to *keep a forest on the land* and to reforest areas which are better suited to growing trees than for any other purpose.

The history of the lumber industry in this country shows a migratory movement from the East to the Lake States, to th South and thence to the Pacific Coast. This is its last stronghold. All this has come to pass in two generations. At present we have enough remaining timber to last perhaps two generations more. Thereafter we will have to depend for future supplies upon home-grown products. Meanwhile we will pay for our past laxity by heavy freight charges on every thousand feet of lumber shipped across the continent. Since the bulk of our people live in the East and half of our remaining timber supply is in the West, this freight charge is today in excess of what it costs to manufacture lumber on the Pacific Coast and offers a substantial margin of profit for home grown timber of equal quality.

We have the forest land, we can keep it producing trees, we can replant such areas as are denuded. If we do not delay in adopting a proper forest policy, we can assure by the practice of forestry the future of the American lumber supply. There is no other way.

CORVUS THE CROW

(*Continued from Page 602*)

When in their movements southward or toward the sea-coast they cross a mountain range, they choose a certain gap through which the great flock pours. This seems to be good evidence that Crows travel by well-known land marks. Solitary Crows are exceedingly rare. Wherever we find one Crow that is a good place to look for more. A lone Crow perched on a tree is usually a sentinel keeping watch and ready to give warning to his companions who may be engaged in some nefarious business, but occasionally in late autumn or in winter a single Crow seems to have been left behind. Whether he has been ostracised and driven out by his companions for some violation of Crow ethics, if indeed Crows have any ethics, or whether he has merely lost his way, no one can say, but in some such cases the gregarious instinct asserts itself and he joins a flock of his smaller kin, Grackles, Blackbirds or Starlings, flies with them, alights with them, feeds with them, and, for aught I know, roosts with them, seeming to find companionship in this insignificant company, while they usually ignore him, although they sometimes follow where he leads.

Sometimes in the spring, when Crow food is scarce and the youngsters in the nest are clamoring, the parents visit the farmyard in search of young chicks. Working together they soon outwit the old hen. One attracts her attention in front and she rushes to the attack, while the other slips up quietly behind and makes off with one of the callow brood. This maneuver, frequently repeated, continually deceives the simple, distracted mother until the brood is much depleted or the farmer shuts them up. Sometimes when a Crow on a nest-robbing expedition is mobbed by small birds he flaps slowly away, followed by the excited songsters, while his mate steals in from behind and appropriates the eggs or young from the unwatched nest. A correspondent writes that in one case the Crow flew heavily away, with nest, young and all clutched in its claws. All these depredations of the Crow are evident. Every one knows that it pulls sprouting corn, and many farmers have suffered from its attacks on melons and small fruits. Game preservers well know its liking for the eggs of ducks and pheasants, but its benefactions to the human race usually pass unnoticed. It is a militant slayer of many of the worst insect pests known to man. Locusts, grasshoppers, potato beetles, weevils, caterpillars, army worms, cutworms, white grubs and many other first-class pests are destroyed in myriads by the Crow. He spends far more time in this beneficial work than in all his injurious activities put together. Crows in normal numbers are a benefit to the land, but when too abundant their injurious habits multiply. It behooves us not to exterminate the Crow but to see that its numbers do not unduly increase.

The Crow is proscribed in every country, and nowhere is protected by law so far as I know, yet he persists and increases in numbers in spite of man's persecution. In the midst of civilization his cry is the one dominant note of the wilderness that still remains. This morning as I crossed Boston Common the caw of a Crow came over the rumble of the city street, and the sable bird flapped down to the top of a tall tree by the frog pond, calling loudly to another in a tree near by.

Thoreau says of the Crow: "This bird sees the white man come and the Indian withdraw, but it withdraws not. Its untamed voice is still heard above the tinkling of the forge. It sees a race pass away but it passes not away. It remains to remind us of aboriginal nature."

GROWTH OF SOUND IDEAS IN GAME MANAGEMENT

By Ward Shepard

THE primary purpose of game protection is to save from destruction species of harmless wild animals that we have no moral right to exterminate. It is the species that we protect and seek to perpetuate. The secondary purpose of game protection is to produce game for hunting, and it so happens that in the world of today this is the object that appeals most strongly to most men who have sufficient interest to act. The two fundamental branches of the subject then are wild life preservation and game production. This article will deal chiefly with game production—and with game production in the wild state rather than with game farming, which is an entirely different subject.

The relation between forestry and game production is intimate; in truth, game production is a part of forestry. Forestry is more than tree culture; it is forest culture. It seeks to perpetuate the forest as an integral unit, so that game production takes its rightful place alongside the other branches of forestry. Foresters must therefore decipher the principles of game management as they decipher the principles of silviculture. Both activities have this in common, also, that each deals with a wild stock that is never in reality domesticated, but that still yields a manifold increase under intelligent care. There is no more need that game should be exterminated than there is that forests should be.

VALUABLE LAND FOR GAME REFUGES

Country like this will not raise crops or hardly even live-stock, but it will raise deer and other game. Millions of acres of wild, rough land throughout the country ought to be devoted to raising game.

Granted a proper system of game administration, there are two essentials to game production; first, the breeding stock, and, second, game range. This is so obvious as to need no comment; yet, in America some species of animals have been exterminated, some are perilously near extermination, and others lead a precarious life in remote parts of their former wide ranges. The preservation and upbuilding of the breeding stock and the safeguarding of the game ranges are the two vital problems of American game management.

The ominous reduction of the breeding stock of game is a perfectly natural result of the methods of game protection practiced for the last century. With a few exceptions of comparatively recent date, which will be noted later, traditional game protection in America has revolved round three ideas: the bag limit, the length of the open season, and the closed season of several years' duration. The bag limit was supposed to limit the number of animals that each person could kill; but it never limited the number of persons that could kill, or the region in which they could kill. Consequently, as population increased, as firearms were perfected, and as means of travel were vastly improved, the bag limit became almost a negligible factor as a means of preserving the breeding stock of gme. Likewise, the gradual reduction in the length of the open season has not appreciably offset the effects of the ever-increasing army of hunters and the ever-increasing ease of killing. To the waning power of these two methods was added the closed season extending through several seasons, an expedient usually invoked only when a species had become alarmingly scarce.

I do not wish to depreciate either the bag limit, the short open season, or the universal closed season as useful means of game protection; but as the sole means they were doomed to failure once America had passed out of the pioneer stage.

Fortunately, more promising principles are coming into play here and there—principles that aim consciously at the heart of the problem, at the questions of breeding-stock and game range. Among these, one of the most prominent is the breeding refuge—a comparatively small sanctuary in the heart of a game range where animals can live and breed unmolested, replenishing the adjacent hunting grounds. This principle is extremely flexible, for the number of refuges and consequently the amount of the breeding stock can be adjusted to the intensity of hunting on the adjoining ranges. Its purpose is the production of game for use. Pennsylvania has made notable progress in this direction, and only recently New Mexico has embarked on a thoroughgoing policy of developing a great system of small refuges throughout her magnificent game ranges.

But where game has reached a precarious stage, a more drastic means of preserving the breeding stock is needed; and here again some of the western States are experimenting with local closed seasons. The local closed season may apply for one or more years to any species of animal in any region. For example, a mountain range or a certain valley might be closed to deer hunting. The local closed season, as compared with the game refuge, ought to be particularly useful for such game as quail or grouse and also for game fishes; for game birds in particular are often subject to wide fluctuations in numbers from season to season, so that the closed season may be a more flexible means of protection than the permanent, posted refuge.

The details of administration for these types of protection will be discussed later.

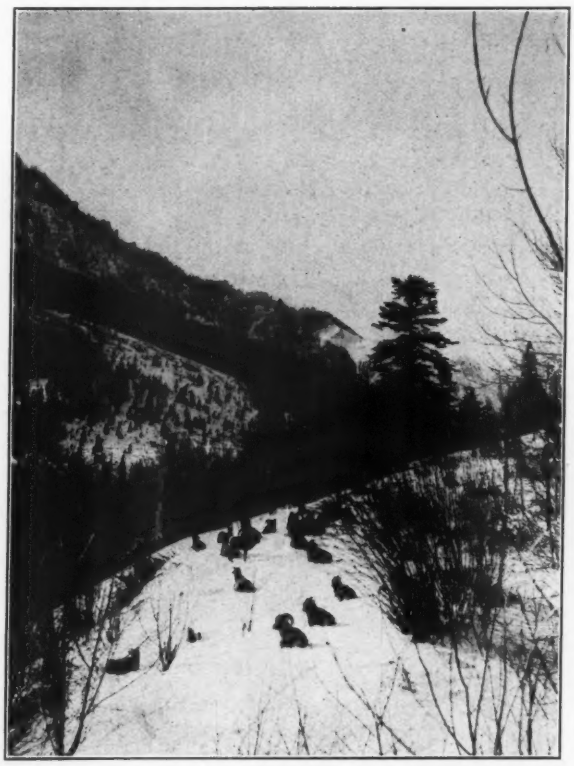
Another principle for safeguarding the breeding-stock —as yet hardly tried—is the quantitative limit of kill. This presupposes a roughly accurate census of game and the determination of how many animals of a given species can be spared each year without impairing the breeding stock. Then only enough licenses to insure the killing of this number would be issued. The obvious criticism of this method is that, as respects most species of game, no game management yet in sight in this country is likely to be intensive enough to insure the detailed game census required. Yet it might be successfully applied even now

ELK AT LARGE

These elk are a part of the remnant of a once abundant and wide-ranging species. The first duty of game protection is to save the various species of game from extinction.

to such gregarious species as elk or to fur-bearing animals of such restricted habitat as beavers.

In contrast with quantitative or volume regulation, the method of refuges and closed seasons may be called regulation by area. Quantitative regulation would obviously require an absolute determination of the animals on a



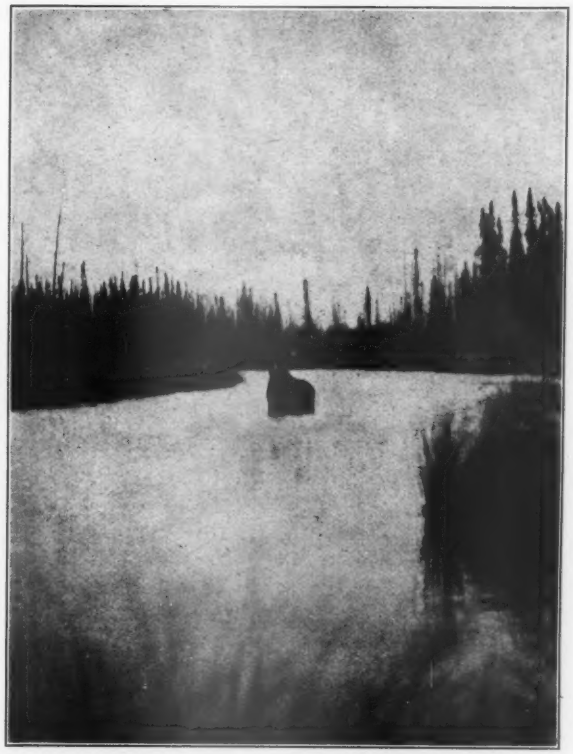
MOUNTAIN SHEEP NEAR OURAY, COLORADO

Protection has made them very tame. Only by closed seasons and refuges will it be possible in the long run to preserve the breeding stock of game.

given range (even though the determination were only roughly correct). Regulation by area, on the other hand, requires first an arbitrary setting aside of a certain proportion of the game range as refuges. Then by an annual check on the number of animals killed in proportion to the number of men engaged in hunting on that range, it would be possible to determine whether the game were increasing or decreasing—in other words, whether too much or too little of the range were included in the refuges.

This discussion of the breeding stock of game has necessarily brought in the equally important question of game range—particularly the game refuge. It is now necessary to make a careful distinction between the wild life preserve and the game refuge. At the outset of this article, attention was called to the difference between wild life preservation and game production. The same difference marks off the wild life preserve from the game refuge. The preserve seeks to perpetuate wild life in its natural state over a comparatively large area—an entirely justifiable and laudble object. It has no economic motive, but appeals solely to the instinctive admiration that all men feel for the grace and beauty of wild animals, and recognizes that they too have claims on existence. In recognizing this claim man performs a moral act.

The game refuge, on the other hand, is economic in



MOOSE ON THE SUPERIOR NATIONAL FOREST

The National Forests, enormous in extent and containing the choicest range for big game in America, offer an unexampled opportunity for rational game management. But before such management can be put into effect, the Federal Government must have the power of creating game refuges on the National Forests.

motive; its purpose is production for use. The small refuge not only preserves the breeding-stock in a hunting country, but by providing a surplus for hunting it meets an insistent public demand and at the same time wins public support by its practical economic usefulness. Between the preserve and the refuge there is the same distinction as that between the National Forest, whose purpose is economic and the National Park, whose purpose is to gratify man's instinct for natural beauty. Just as it would be futile to attempt to set aside the great bulk of our forests as parks, so it would be unwise to throw the bulk of the game range into game preserves. In choosing between the preserve and the refuge, the object in view is of the utmost importance; yet their wide contrast of purpose has rarely been clearly perceived and acted on.

But game refuges and game preserves do not answer the whole problem of game range. As the private ownership of game range restricts the public regulation of the game on that range, it is essential both in the interest of public and scientific game management and of the preservation of democracy in sport to maintain public shooting grounds. These in the future will be confined more and more to public forests, a fact which overwhelmingly emphasizes the need not only of greater interest in game by foresters, but of sound game management by public agencies.

These new tools of game management, however, will be ineffective without a radical reform in the machinery of administration. Almost without exception, the American States have attempted to regulate game by detailed statutes, fixing open and closed seasons, bag limits, etc. This is a clumsy method, for legislatures are not fitted for administration. They are slow to act, have ineffective means of gathering information, and are usually unable to follow a consistent administrative policy. The State game wardens and commissions have usually been merely police agents, empowered to prosecute poachers. What is needed is the delegation of full administrative power to competent wardens or commissions—power to deal promptly and effectively with the multitudinous problems met in managing a great natural resource.

How far is modern legislation meeting these principles of sound management—the safeguarding of the breeding stock, the preservation of game range, and a sane, flexible system of administration? The Federal migratory bird law is one of the best of the modern laws, and points the right way. It delegates to the Secretary of Agriculture the business of preserving migratory birds. He accomplishes this end by fixing the seasons and bag limits, by prohibiting shooting in the breeding season, by closing certain species against hunting, by prosecuting poachers, and by other means. This law, therefore, meets two of the three essential requirements

DUCKS UNDER PROTECTION

These ducks are on the Wichita Game Preserve in the Wichita National Forest. The migratory bird law protects the breeding stock. The urgent need now is protection of breeding grounds, which are being rapidly drained.

in sound game management: it provides a flexible method of administration, and it succeeds in preserving the breeding stock. But it fails in the third requirement of providing the breeding ground and the range. Until steps are taken to preserve swamps and lakes as breeding and feeding grounds, migratory waterfowl are not safe. Here again, public ownership is necessary; and this ownership the public shooting ground bill now before Congress aims to assure.

The recently adopted State game law of New Mexico is another example of modern legislation. It secures a flexible administration by creating a game commission endowed with broad regulatory powers. It assures the

A THREATENED SPORT

Where will the sons of these duck-hunters find their hunting? This question the Public Shooting Ground-Game Refuge Bill is trying to solve by authorizing the Government to buy breeding and shooting grounds now threatened with extinction by drainage.

preservation of the breeding-stock by authorizing the commission to establish refuges, local closed seasons, and feeding grounds. It permits the purchase or leasing of refuges and public shooting grounds. In addition, the best game ranges of New Mexico are within the National Forests, in which State game refuges may be established by the Commission. This law, therefore, comprehensively attacks the three great problems of game production: the land, the stock and the administration.

HIGH NESTING GROUNDS

The ptarmigan nests on the higher peaks of thhe Rocky Mountains as far south as New Mexico. The wild game of the United States ranges from these Arctic birds to such semi-tropical animals as the peccary and the jaguar—a marvelous varied heritage of which we are merely the trustees.

The big game ranges of the West are chiefly within the National Forests. Year after year legislation has been attempted that would authorize the President to create game refuges in the National Forests, but without success. Yet the National Forest game refuge is highly important for the protection of big game.

The next great legislative problem will be in the individual states, to modernize obsolete laws and to vitalize impotent state game departments by giving them power. The future of game in America depends on the degree to which the underlying principles of game management are clarified and put into effect. Foresters, because they are trained in the exact regulation of a great organic resource, are peculiarly fitted to clarify the principles of game regulation; and this peculiar advantage places on them a moral duty to take an active part in perpetuating our diminishing wild life.

AN UNWRITTEN TOMBSTONE

This is the spot,
Where once there stood,
A stand of pine,
Both straight and good,
A stand that smiled,
Then laughed out loud,
And brightened the world,
Every time it bowed.

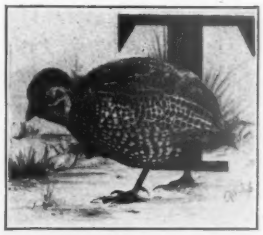
This is the spot,
Where once there stood,
A careless man,
Camped out in the wood,
Who threw a match,
That burnt the pine,
That flooded the world,
With its bright sunshine.

—Otto L. Anderson.

WILD PIGEONS AND DOVES

By R. W. Shufeldt, M. D., C. M. Z. S., F. A. O. U., etc.

(PHOTOGRAPHS BY THE AUTHOR)



TAKEN in their entirety—that is, as a list of species and subspecies — we have some seventeen different kinds of wild pigeons and doves in this country, and each and all are contained in one group designated as the family *Columbidae*. This number represents but a small part of the total list of pigeons and doves found wild in various quarters of the world, as several hundred different kinds have been described by ornithologists, and new species or subspecies are being discovered every year.

Here in this country, our typical Wild Pigeons are

BAND-TAILED PIGEON (*Columba f. faciata*).

Fig. 1.—This bird ranges through western North America, southward to Nicaragua, and east to western Texas. It is the form that has been so frequently mistaken for our extinct Passenger Pigeon (Fig. 4).

contained in the genus *Columba*, and, aside from the Band-tailed Pigeon, all have their habitats in southern latitudes. From time to time, the Band-tailed Pigeon, which is a large and handsome form, is mistaken for the now extinct Passenger Pigeon by inexperienced observers. It ranges from southwestern British Columbia as far south as Central America, being quite abundant in some parts of its range over western North America. The species has been known since 1823, specimens of it having been collected in Colorado by the expedition under Long. It is a big, stout species, and gets its name Band-tailed from the black band that crosses the tail feathers, which latter is square and not long and pointed as it was in the Wild Pigeon and in our existing Mourning Dove. The plumage is beautifully irridescent or bronzy in several places, particularly on the sides of the neck. Then, too, as a white demi-collar is found on the nape of the neck, the bird is known to many as the White-collared Pigeon. (Fig. 1.)

Sometimes this Band-tailed Pigeon occurs in enormous flocks, especially in western oak forests where acorns are abundant, upon which this species principally feeds.

As in the case of other wild pigeons, this form builds a frail, shiftless nest, which may be placed upon the ground in rarer instances, though more frequently in bushes or trees. It is said to lay but one egg when nesting within our southern boundaries, though most wild pigeons and doves commonly lay two—white, shiny eggs, of an ellipsoidal form, as is the case with the eggs of all our wild pigeons.

The late Dr. Elliott Coues states in his description of this species that it lays "almost every month of the

THE RED-BILLED PIGEON (*C. flavirostris*).

Fig. 2—This is another form which has occasionally been mistaken for the Passenger Pigeon. It occurs in the Lower Rio Grande Valley, and ranges as far south as Costa Rica.

THE WHITE-CROWNED PIGEON (*C. leucocephala*).

Fig. 3—It is a large species, first described in 1792 by Bonnaterre from specimens taken on Guadeloupe Island, West Indies. The bird is very striking in appearance on account of its white crown and the wonderful irridescent colors on the sides of the neck.

year;" and when but one egg is laid, he has heard it said that it is "sometimes carried about by the female." But in what way it is "carried about," this authority does not commit himself.

In Lower California we have another wild pigeon known as Viosca's Pigeon, which is a good deal like the species just described, but the band on the tail may either be absent or only slightly in evidence; in fact, this pigeon is but a subspecies of the true Band-tailed form.

In the same region with these, with its range extended to New Mexico, Arizona, and, perhaps, to the extreme southern part of Texas, one may meet with the Red-billed Pigeon—a beautiful species that lays but a single egg and in a nest of a more substantial character than birds of this family usually build. (Fig. 2.)

Passing to Florida—more especially to the Florida Keys—one may meet with two other elegant forms of these birds, the White-crowned and the Squamous Pigeons, which are also found on certain islands of the West Indies—the last-named bird being only a casual visitor on the islands of Key West. (Fig. 3.)

No longer is the genus *Ectopistes*—the genus next following *Columba*—represented anywhere in the world. It contained but the one species, the famous Wild or Passenger Pigeon (*E. migratorius*), which is now utterly extinct. Last spring (1921) *The Scientific Monthly* reproduced an article of mine devoted to the "Published Figures and Plates of the Extinct Passenger Pigeon," which was illustrated by fifteen fine figures, selected from the works of various authors who had given pictorial records of the species in their writings. (Fig. 4.)

As many of us are aware, the Passenger Pigeon is a species having a most remarkable history—a history which has been told by many authors in many places. In my above cited article I said: "No species of bird known to man, in all time, can in any way rival the extraordinary series of chapters that go to make up the history of the life-span of this now totally extinct pigeon. As a story filled with romance, prodigality, cruelty and short-sightedness, it outranks the most unbelievable fables of the ancients. As one who, among many, witnessed the marvelous flight of these birds in the early seventies, I never for a moment thought how soon the species would be in the same category with those other birds of which the world will never again see living specimens. We can now only regretfully look back on the picture, and systematize the data at hand with respect to the literary part of this; and not a little has been accomplished by those competent to undertake it."

In the days of Wilson and Audubon, flocks of Wild

CASE OF WILD PIGEONS, U. S. NATIONAL MUSEUM

Fig. 4—This is the now extinct pigeon of North America. It will be noted that there are nine in the flock, the birds having been mounted by the late Nelson R. Wood.

Pigeons, in many cases numbering several *billions* of birds, was no unusual thing; some of the flocks I saw in southern Connecticut possibly contained as many as a million, but no more. In certain localities they were being shot down without mercy, and only a small proportion of the victims gathered up for the markets.

The last of all this great host consisted of some twenty odd birds that lived in the Cincinnati Zoo; but one after another of these passed away, leaving, finally, but a single female specimen, which likewise died in September, 1914. This specimen was sent to the United States National Museum, being promptly turned over to me for a record. I first had three life-size photographs made of it at the photographic rooms of the Museum, and then I took it to my home, accompanied by the late William Palmer, who made a skin of the bird in my workroom, while I photographed its anatomy at different stages of the operation. A full history of all this I have published in *The Auk*, the official organ of the American Ornithologists' Union, and in other places.

Eventually the specimen was mounted by the late Nelson R. Wood, and it is now on exhibition in the Division of Birds of the United States National Museum, where I was permitted to make a photograph of it; a reproduction of that picture was published some time ago in *American Forestry*. It was only in fairly perfect plumage—the usually beautiful tail of the species being in a very ragged condition, which was plainly shown in the cut.

MOURNING DOVE

Fig. 5—This is a female specimen of the species, and is a reproduction of a photograph from life made by the author when it was kept by him as a pet; it is widely known as the Long-tailed Dove.

NEST AND YOUNG OF MOURNING DOVE

Fig. 6—From a photograph made by the author just after discovering the nest in a grove of pine trees. At this age the young have a plumage of soft, fluffy white down. Note the white "nib" on the end of the bill, just like that seen on newly hatched chickens and other birds.

Artists of many countries have given us illustrations of this bird, and to this Japan forms no exception. In Dr. C. O. Whitman's great volume on domesticated pigeons, with extensive references to the wild forms, Mr. Hayashi, the well-known Japanese painter of birds, gave figures of both sexes of our extinct Wild Pigeon, and these were published in my above-referred to article in *Scientific Monthly*.

In our bird fauna we have some very beautiful wild doves—some eight species arrayed in as many genera. Of these I give a portrait of our well-known Mourning Dove, together with a figure showing the nest and young of this favorite species; these are both from life and taken by myself a few years ago. This species has a number of vernacular names in addition to the one given above—as the Turtle Dove, the California, and the Wild Dove. It is one of the earliest comers in the spring, and its lovely cooing is familiar to hundreds of nature lovers in this country. (Figs. 5 and 6.)

Many years ago, when I was serving as Post Surgeon at Fort Laramie, Wyoming, a wonderful flight of these

ZENAIDA DOVE (*Z. zenaida*)

Fig. 7—Another name for these birds is the Love Dove, and the species here shown was named for the cousin and wife of Prince Charles Lucien Bonaparte (Zenaide). It is a beautiful species in life.

birds took place in that part of the country. It reminded me very much of the flights of the Wild Pigeon which I saw in the early seventies, though the multitude was not quite so extensive. Nevertheless it was a marvelous sight to see thousands of these gentle birds pass through the timber, and to hear the tremendous roar that arose from the use of so many pairs of wings. In some places they rested on the naked prairie in hundreds, where rattlers, hawks, and foxes got away with no end of them and their helpless young. This species is the nearest living relative we have of our extinct Wild Pigeon—the only species having the same form of tail.

The lovely Zenaida Dove is listed among our birds; but it only occasionally breeds on the Florida Keys, while the White-winged or Singing Dove occurs regularly in Florida and throughout a large area of the Southwest; it has also occurred in Colorado. It requires keen observation to distinguish the sexes in this species—the female being almost as handsome as the male in the matter of plumage. (Fig. 7.)

Finally, we find in our faunal lists the cunning little Dwarf Doves that are ground-loving species and residents of the Southern States. They make very attractive pets and many breed in captivity. (Fig. 9.) Then we have the Inca or Scaled Dove, here shown in Figure 13. We are to note that it possesses a long tail, and thus reminds one of our Mourning Dove and the Passenger Pigeon. All these very small species of the family are found only in the extreme southern sections of our country, as the Florida Keys, the Gulf States, and only rarely further north. This beautiful little Inca or Scaled Dove which as just said, resembles a small

WHITE-FRONTED DOVE

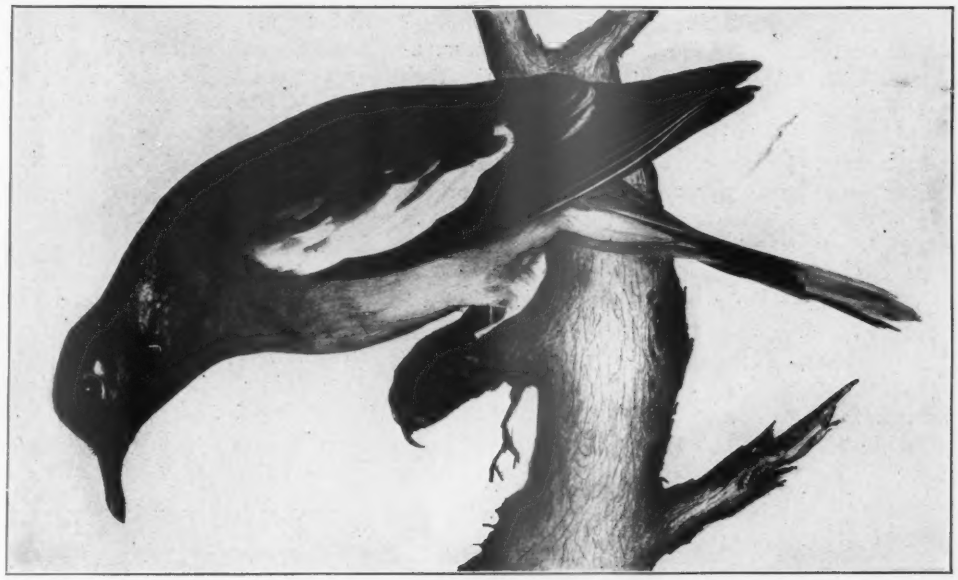
Fig. 8—This dove occurs nearly all the year round on its range, and it has been known to breed there. In agreement with most pigeons and doves, it lays two eggs of a pale buffy-white color. It usually builds its big nest in a bush of twigs and "weed-strips."

A PYGMY OF THE FAMILY—THE COMMON GROUND DOVE

Fig. 9—Its scientific name expresses both its size and habits—that is *C. passerina terrestris* or a dove of sparrow-like proportions that spends its life on the ground. It is a southern form and rather a common one. Stragglers have been seen in Washington, D. C., and New York.

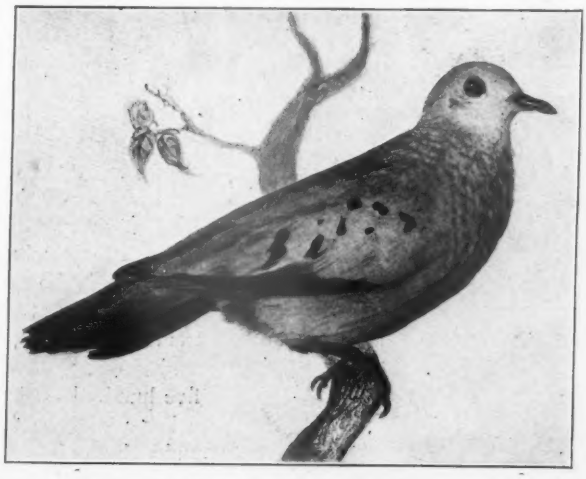
edition of our Mourning Dove, occurs in the southern regions of our great southwest, in some parts of which territory it is a not uncommon species.

Our elegant Blue-headed Quail Dove is found only on the Florida Keys, where it is a rare species; the top of its head is of a brilliant blue, bounded by a black stripe running through either eye and bounded below the eye by a stripe of glistening white. Its general plumage is of a rich olive chocolate, changing to a reddish purple on the under parts, paling out near the median line of the body. These Quail Doves are distinctly American birds, with no near relatives in any other part of the world; and they are called Quail Doves for the reason that in their plumage markings they resemble certain species of Partridges, but there the resemblance ceases.



WHITE-WINGED DOVE (*Melopelia asiatica*)

Fig. 10—It has received its name from the extensive white area on either wing as shown in the figure. It has an incessant cooing note in the spring and early summer—hence the name *Paloma cantador* given it by the Mexicans.



MEXICAN GROUND DOVE

Fig. 11—Mexican Ground Doves (*C. p. pallescens*) are found in Lower California, southern Arizona and lower Texas regions.

I may say that in no respect can we draw very sharp distinctions between the true wild pigeon on the one hand and the doves upon the other; the groups practically merge into each other. Either group offers much of interest in the matters of structure, habits, nesting, and geographical distribution, while there is much to be learned about them yet—at least sufficient to induce our young naturalists to employ their observational powers with the view of obtaining unrecorded facts in their life histories.

More than a century ago, Alexander Wilson, who so truthfully portrayed the lives and habits of many of

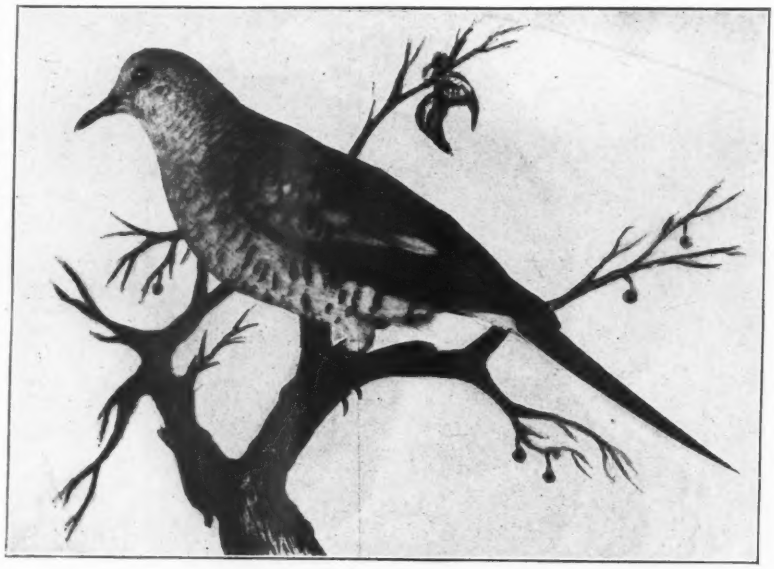
THE KEY WEST QUAIL DOVE

Fig. 12—A rather highly colored species with respect to plumage (*Geotrygon chrysia*), inhabiting the Florida Keys, Bahamas, Cuba and Haiti. The Ruddy Quail-Dove is the only other form of the genus, while the Blue-headed Quail-Dove (*Starnoenas cyanocephala*) is another beautiful form and the only one not pictorially illustrated in the present article.

our native birds, says of this Carolina Pigeon that "their flight is quick, vigorous, and always accompanied by a peculiar whistling of the wings, by which they can easily be distinguished from the Wild Pigeon. They fly with great swiftness, alight on trees, fences, or on the ground indiscriminately; are exceedingly fond of berries, partridge berries, and the small acorns of the berries of the holly, the dogwood, and poke, huckleberries, partridge berries, and the small acorns of the live oak and scrub oak. They devour large quantities of gravel, and sometimes pay a visit to the kitchen garden for peas, for which they have a particular regard.

"In this part of Pennsylvania, they commence building about the beginning of May. The nest is very rudely constructed, generally in an evergreen, among the thick foliage of the vine, in an orchard, on the horizontal branches of an apple tree, and, in some cases, on the ground. It is composed of a handful of small twigs, laid with little art, on which are scattered dry, fibrous roots of plants; and in this almost flat bed are deposited two eggs of a snowy whiteness. The male and female unite in feeding the young, and they have rarely more than two broods to the season.

"The flesh of this bird is considered much superior to that of the Wild Pigeon; but its seeming confidence in man, the tenderness of its notes, and the innocency attached to its character, are, with many, its security and protection; with others, however, the tenderness of its flesh, and the sport of shooting, overcome all other considerations. About the commencement of frost, they begin to move off to the south; numbers, however, remain in Pennsylvania during the whole winter."



SHELL OR SCALED DOVE

Fig. 13—The species here shown is the Inca Dove (*Scardafella inca*), which ranges over our southwestern border. The sexes look alike and the birds are small. Two species are known, and one writer refers to them as a "remarkable genus."

Referring to the nest and young again, it will be appreciated by a glance at the accompanying cut how accurately Wilson described the nest of this dove (Fig. 6), and, although the bird did not select a cedar for its home, it did build in a pine tree, which is the next thing to it. It is probable that the Carolina Dove has built, as has not a few of its congeners, this same kind of flat, poorly constructed and shiftless nest for centuries, and when it is placed high enough in the tree, with no limbs to obstruct the view, one may easily see through a structure of this kind, readily observing the eggs or young, should either be in it—this I know from personal observation.

Like all pigeons and doves, the almost naked squabs are by no means noted for their beauty or attractiveness, and not until they gain their full plumage are they in any way engaging. On one or two occasions, while serving as surgeon at some army post in Wyoming, I have reared these doves, taking them about the time when their feathers are first in evidence. They make lovely pets, possessing many traits that appeal to the lover of birds, although many are unable to endure their constant cooing during the breeding season.

Carolina doves get along well with other species of birds in a large cage, an excellent example of which may be seen any day at the National Zoological Park, at Washington, where a number of them are thus associated with various birds from different parts of the world, such as the widdah birds, Java sparrows, ground doves, cardinals, several sorts of finches, canaries, and so on.

Once, when out shooting near old Fort Laramie, in the territory of Wyoming, a wild Carolina dove flew past me at a tremendous rate. It had not gone over five hundred yards, when I saw it suddenly double up and fall to the ground. At first I did not realize what had happened to it, as the bird was evidently in the best of health and no shot had been fired in my neighborhood. Upon picking the bird up, I found its head nearly twisted off its body, and the solution of the casualty was in plain view directly over my head where I stood. At its high rate of speed, the poor bird had flown against the telegraph wire that led from Cheyenne into the Post. Evidently the poor thing had not noticed it—at least not until it was too late. Whether this would have happened to a hawk of rapid flight, such as a Duck Hawk, with its wonderful sight, it is hard to say. I am inclined to think, however, that the sight of a dove is not as quick or as keen as that of the representatives of the falconine birds—nor need it be when one remembers the habits and requirements of the species in the two groups.

In Audubon's account of this dove we find several slips, in the text as well as on his plate of the species. Our space will not admit of noticing them; but upon the other hand he invites attention to an often overlooked fact when he says: "When shot, or taken alive in the hand, this and our other species of Pigeon, lose the feathers on the slightest touch, a circumstance peculiar to the genus, and to certain gallinaceous birds."

When both species of birds were more than abundant in this country, Audubon noticed that "a few individuals mix with the Wild Pigeons, as do the latter sometimes with the Doves."

In connection with the ease with which the Carolina Dove parts with its feathers, I am reminded of an incident that occurred many years ago—or along about 1874. In those days I was living in Washington, and connected with the Army Medical Museum in a civil capacity. I was considered, since I was thirteen years of age, to be unusually expert in the making of bird skins for collections. This was well known to many of my friends in Washington, the reputation having followed me down from New England where I lived as a boy, and where I had made a collection of some three hundred bird skins of the species occurring in Fairfield County before I was thirteen years of age. While living in Washington about the above mentioned time, it was my good fortune to have as friends many of the scientific people whose homes were in the city, among them Prof. Lester F. Ward, one of the country's best known botanists, who, later on, through his work in various lines, came to be classed with the philosophers of the Western world. Professor Ward was possessed with the desire to learn how to make a scientific bird-skin, as he expected to do some exploratory work. He came to me for instruction, which I told him I would be pleased to give; so, upon one very warm evening in the late spring, he put in an appearance at the room where I lived as a medical student, bringing with him a recently shot specimen of the Carolina Turtle Dove. As we were seated at a little table, it did not occur to me to first inform him that that species of bird invariably parted with its feathers upon the slightest provocation, and no sooner had I made the ventral incision—the initial step in removing the skin—than the feathers began to come away in the most provoking manner. Professor Ward begged to know if we "always lost that many feathers in making up a skin;" to which I replied that it was only in the case of the wild pigeon tribe and in some tropical species. I saw that the statement did not quite satisfy him—a fact that in no way lessened the trouble or my embarrassment. However, I made up the skin, and when it was dry presented him with it; but I always felt that it was hard for the Professor to believe my tale about the feathers of wild doves and pigeons coming out so easily, and I am strongly of the opinion that he never made any use of the information I had given him that evening, nor do I recall that he ever, during the rest of his life, referred to the experience again. Since then nearly half a century has passed. Professor Ward died many years ago, and I am again residing in Washington. It was only the other day that I made up a fine skin of a male starling that had been found on one of the city streets, having been frozen to death.

New Jersey's Forester

CHARLES P. WILBER, who has been State Firewarden and Assistant State Forester of New Jersey for the past twelve years, has recently been appointed to the position of State Forester of New Jersey following the resignation of Alfred Gaskill. Mr. Wilber is a native of New Jersey. He was a graduate of Rutgers College in the class of 1905 and of the Yale Forest School in 1907.

During 1907 and 1908 he was interested in lumbering, and from 1908 to 1910 he was with the United States Forest Service in District 4, working on the National Forests in Idaho, Montana, and Utah. In 1910 he was appointed State Firewarden and Assistant Forester for New Jersey and since then has built up a wide-awake forest fire service with a splendid record of achievement and public support. He initiated a division organization in 1911, which provides for a trained state employe as firewarden in each of the three divisions of the state, to supplement and supervise the local firewarden force. In 1913 the first lookout tower was built in New Jersey; there are now 13 covering about half of the state. Mr. Wilber comes to his new position while yet a young man and no doubt will carry forward New Jersey's forestry policy in the same progressive and constructive fashion which has characterized his work in the past.

A Ship's Knees

ONE of the minor and yet exceedingly important articles entering into the construction of a wooden ship is the "knee." A ship knee is a right angled wooden brace used to give strength to the framing, and is fashioned from the natural crook of a tree formed by a heavy, shallow horizontal root and a section of the trunk. Knees when finished are some times as much as six or seven feet high and many of them are four feet high. The tremendous impetus to wooden shipbuilding brought about by the war, has resulted in the establishment of a sawmill at Portland, Oregon, designed exclusively for the finishing of ship knees. The timber preferred is second-growth Douglas fir, found growing in shallow soil so that the roots turn off at right angles to the trunk and thus give the proper shape. The standardized wooden ship requires some 200 knees of all sizes, while another type of wooden ship, also under construction, requires more than 160 knees.

SPREADING THE FORESTRY IDEA

By Philip W. Ayres

Forester for the Society for Protection of New Hampshire Forests

THE Forestry movement has entered upon a new phase in the United States. Returning from France, Col. Henry S. Graves, while Chief of the United States Forest Service, called together the foresters and lumbermen of the country in a series of conferences throughout the land, pointed out to them the serious depletion in our timber supply, its unequal distribution, and asked their advice and cooperation in finding adequate remedies. This was followed by the publication in June, 1920, of Col. Wm. B. Greeley's illuminating report to the United States Senate on the timber supply. These efforts, taken together, separate the new forestry from the old. They gave us the facts about the standing timber in this country, its location, the amount of idle forest land in the midst of a great population, and the enormous freight rates that the Eastern states and cities are paying to bring wood material from the West.

Prior to these statements and publications, the forestry movement was based upon less definite knowledge and made a less definite appeal to all citizens. Many thoughtful people were interested in it; all were proud of the achievements of the Forest Service on the great forest reserves at the West; it was realized by few that these reserves will hardly meet the growing needs of the West, and that in the five or six eastern states that still export timber in excess of imports, the amount produced by all of them is not enough in a single year to meet the needs in a state like New York or Pennsylvania. Now the facts have been clearly stated for the whole country. The inevitable timber shortage is clearly before us affecting our whole economic structure. The situation is brought home to every business man and to every citizen. There is a new patriotic appeal to the whole country to arouse itself.

Many new problems appear. What is the Government's duty in providing timber for the people of the country? What must the states do? Has the time arrived when the private owner has new obligations and responsibilities to the public? Who is to bear the burden of the new systems and methods that are proposed? How shall we reforest 81,000,000 acres of waste and idle land in our midst equal in area to all of New York and Pennsylvania, or to the Kingdom of England, Scotland and Wales? The time has come to change from the old destructive lumbering, and where shall the burden fall?

These problems and relationships give a new opportunity and a new importance to the several forestry associations. It is not surprising that states hitherto unorganized, like Georgia, are starting new popular movements to educate the people and to secure immediate legislation. We welcome the new Georgia Forestry Association. The new forestry association in Maine has had two successful meetings at which thoughtful men have emphasized the need for a wide awakening. The older associations, like that in Pennsylvania which was the first in the field, are organizing new branches. The call for forestry associations as an educational force in spreading the forestry idea has never been more clearly apparent. An association is needed in every state, with the American Forestry Association leading and inspiring them all. The entire nation must be aroused to cooperative action.

It was in this spirit that the recent meeting of the Society for Protection of New Hampshire Forests occurred at Keene, N. H., August 29 to 31. It brought together a group of people equipped with the facts and acute in suggestion and criticism of the methods to be adopted. The State and National programs were considered. Col. Greeley spoke in no uncertain terms of the need for a National forest policy that will bring the Federal Government, the several states, and the individual land owners and lumbermen all into close cooperation to meet the ever-present demand for wood material. Dr. Henry S. Drinker, newly appointed Forestry Commissioner in Pennsylvania, and President of the Pennsylvania Forestry Association, brought a statement of the situation in the Middle Atlantic States. Mr. R. S. Kellogg, of New York, spoke for the National Forestry Program Committee on the Snell bill that is pending in Congress. Mr. O. M. Porter, of New York, represented the American Paper & Pulp Association. Mr. D. L. Goodwillie, of Chicago, Chairman of the Chamber of Commerce of the United States, sent a message urging a great popular movement for the planting of trees. Elwood Wilson, accomplished forester of the Laurentide Company, in Quesbec, showed how the timber areas in Canada are being mapped by airplane photographs and utilized by Canadian manufacturers. He stated that there is no great hope for the States in the definitely limited Canadian supply.

At this meeting the New England states were well represented. Philip P. Wells, president of the Connecticut Forestry Association, spoke of the attack that certain interests in New York State are making through the legislature upon the National Waterpower Law. Professor Terry, of Middlebury College, who has charge of 30,000 acres in the college forest, represented Vermont. Professor Grose represented the Massachusetts Agricultural College and the goodly college forest under his direction. The new forest taxation law in Massachusetts was tersely set forth by Harris A. Reynolds, the vigorous Secretary of the Massachusetts Forestry Association, which precipitated a very active discussion, for in New Hampshire timber is still taxed under the old General Property taxes of one hundred and fifty years ago. The Gov-

ernor of New Hampshire, Albert O. Brown, who was for ten years President of the State Tax Commission, pointed out the serious situation when the taxes on timber become a factor in the early removal of forests before they are mature. Ex-Governor Robert P. Bass and S. F. Langdell, President of the New Hampshire Pine Lumbermen's Association, both spoke for the principle of a deferred tax on timber, or a yield tax, to be paid when the timber is cut and the owner has the wherewithal to pay. It was pointed out that not infrequently it is unprofitable to hold growing timber in New Hampshire except for speculative purposes, because the annual tax rate is sometimes greater in value than the annual growth on the timber lot.

The most notable single contribution was that from Mr. W. R. Brown, of the Brown Company, Berlin, N. H., President of the State Forestry Commission, on the results of a very careful experiment in the costs of brush burning in spruce woods that his company made in cooperation with the United States Forest Service. This paper will be printed in full in the Journal of the Society of American Foresters and will undoubtedly receive very wide reading. The point in general is that the cost of brush burning in the woods in spruce operations is approximately $1.05 a cord, which is prohibitive. Another notable contribution was that of Mr. Allen Chamberlain, of Boston, upon the traditions and history of Monadnock Mountain, which we hope will find expression later in book form.

A marked feature of the meeting, that lasted three days, was the hospitality of the City of Keene. At the opening session the Chamber of Commerce and citizens provided a public dinner, to which were invited not only the members of the Society and the State Forestry Commission, but also by special invitation through the County Farm Bureau the leading farmers and land owners of Cheshire County, who were present to the number of nearly two hundred. These were addressed by Professor Richard Fisher, Director of the Harvard Forest School and of the College Forest at Petersham, and by Professor James W. Toumey, Dean of the Yale Forest School. Both used lantern pictures showing in detail how a woodlot may best be managed for profit. The pictures of thinning and conditions before and afterward were clear and convincing. At this dinner the Mayor of Keene, Major Orville E. Cain, presided, and presented two deeds of land, one to the State Forestry Commission, being a gift from Mr. Joel E. Poole, of Jaffrey, N. H., of a road in finished condition from the highway to the State Forest Reservation on Monadnock Mountain, and the other a gift to the Society for Protection of Forests from Mr. William Pearson, of Keene, and his associates, of a new forest reservation of eleven acres in extent, at the summit of City Hill in the town of Nelson, N. H. Read Admiral J. B. Murdock responded for the State Forestry Commission, of which he is a member, and Allen Hollis, Esq., responded for the Society as its President.

There was an excursion led by Professor Toumey to the one thousand acre tract of the Yale Forest School located three miles southwest of Keene. A visit was made to the extensive nurseries of seedling forest trees of the Keene Forestry Association. About forty persons visited the famous Pisgah Forest of five thousand acres in the southwestern corner of New Hampshire, twenty-five miles from Keene, and saw the largest groves of primeval pines and hemlocks that remain standing in New England. A visit was made to the valuable pine and hardwood forests on the Five Mile Drive around Keene that have been so long preserved and held for public enjoyment by Miss Mary B. Dinsmoor, and a visit was made to the famous pine plantation in Westmoreland, a tract of three acres planted forty-five years ago at a cost of $35 for land and planting, for which the present owner paid $1,000. It is estimated that each acre now carries from fifty to sixty thousand feet board measure. Other visits were made to the reservations of the State and of the Society for Protection of Forests on Monadnock Mountain, and to the interesting pot holes near Keene on the tract of one hundred acres that the city will acquire as a Municipal Forest.

The meeting was attractively housed at the Keene State Normal School, through the courtesy of the State Board of Educaion and the principal of the school, Mr. Wallace E. Mason. The guests were lodged in the dormitories, and a general school holiday atmosphere prevailed.

Among the topics for consideration were larger appropriations by the State for the purchase of forest land, new forest taxation laws, the extension of purchases in the White Mountains and Southern Appalacians under the Weeks law, larger appropriations throughout the land for the suppression of forest fires, a renewed and vigorous effort to control the white pine blister rust, which is advancing throughout New Hampshire, except where currant and gooseberry bushes have been removed, and a pledge to Colonel Greeley to support him heartily in his efforts to secure through Congressional and State action the establishment of a National forest policy that will provide a timber supply for a great people.

TREES THE MOST NEEDED OF ALL CROPS

POINTING out that Nature does not "give" trees to man any more than she gives corn or wheat but merely lends these things to man who must take care of them, the Philadelphia *North American* carried a forceful editorial on "The Crop That Must Not Fail." In part it follows:

"How seldom any one considers the crop that primarily controls all other crops—the tree crop!

"It is a fact—terribly proved by most of the deserts which pockmark this sphere—that lack of care for the tree crop has cost more lives and been responsible for more material loss than all wars combined. For all soil fertility is primarily a matter of water—not only the moisture precipitated through rain, but that stored beneath the surface—and when land is denuded of trees, this latter water supply, which is the more vital of the two, gradually sinks to a point beyond reach of the roots of food-bearing plants.

Men do not seem to learn through force of example, however, and even experience is an over-rated teacher. So, starting as a nation in 1776 with an estimated 900,000,000 acres of virgin forest, we have in the 146 years of our national existence properly used one-fifth of this; negligently permitted another fifth to be destroyed by fire, and criminally wasted a third fifth in what can only be called slaughter.

Is it to be wondered that men like Pinchot and Pack have felt it a first duty to their country to cry out against such waste! Yet one cannot wonder at the attitude of the average person, for this average person never has thought of trees as a crop—the most necessary of all crops, in fact.

Nature doesn't *give* trees, any more than she *gives* corn, wheat, potatoes or cotton. She lends these riches, and man is to live on the interest earned through his care and labor.

Those who neglect or misuse these loans fail. Nation after nation thus has failed. Whole civilizations have crumbled from such causes. We do not pretend to any knowledge of the decrees of destiny, but any one with eyes to read can gain definite knowledge of the undermining factors.

Foremost among these, in every instance, has been lack or neglect of field and forest, and since the fields productivity depends on the vigor of the forest, it is not unreasonable to rank the latter as the decisive crop. At any rate, Time has shown us that nations which desire to stand and prosper cannot permit their tree crops to fail.

Nogales Herald—More forest fires occurred in 1921 than during any previous year of record, but, owing to improved methods of detection and extinguishment the area burned over was below the average in extent. Notwithstanding abnormal drought, public carelessness was chiefly to blame. Clearly the American public still lacks appreciation of its great natural heritage. As a people priding ourselves upon our practical outlook, the market value of our timberlands in yielding lumber for building and other purposes must be apparent.

Detroit News—Undoubtedly when we began to denude our forests years ago, there were many people who warned us against this practice. They told us that the day would come when we should deeply feel the loss of the timber we were wasting so shamefully.

Today we are confronted by a stiuation which is the outcome of our early recklessness. Very wisely we are advised by Charles Lathrop Pack, president of the American Forestry Association: "If the business men of the Lake States want a forest experiment station, and want to get a start to put 20,000,000 acres of land to work growing trees, now is the time to speak." This may sound a little bit like belated advice, but it is, in view of past prodigality, the best advice to be had.

The only question is whether we are going to give heed to it any more than we gave it to the men who years ago advised us to be saving of our timber.

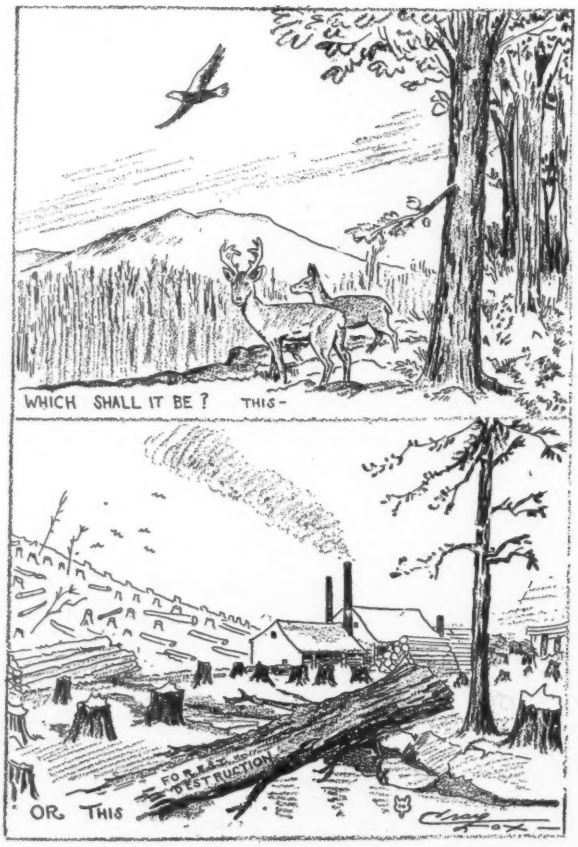
Boston Herald—The president of the American Forestry Association says coal strikes will have no terrors when municipalities own woodland from which they can cut fuel.

Tampa Times—A timber denuded land is a lost land, unfit for habitation, cultivation or the sustenance of animal life. The problem must be attacked on a national scale. It is not a regional or a sectional subject. Every part of the country must do its share. The first important need is an intelligent conception of the magnitude of the problem. The second is the realization that labor, time and money must be expended.

Geneva, N. Y., Times—Charles Lathrop Pack, president of the American Forestry Association, admits that the rail and coal strikes are bad things, but sees in the condition which they create an added impetus for the planting and maintaining of forests, public and private.

The municipality which has a well conducted forest preserve is less at the mercy of a shortage in other fuel supplies than other communities. The private property owner who systematically cultivates and utilizes his wood lot need have no great anxiety over diminishing coal piles or gas depletion. It is true that

Forest Protection



—Fox—In the Rochester *Democrat and Chronicle.*

SAYS THE PHILADELPHIA NORTH AMERICAN

other fuels are more convenient and more practical in most cases than the trusty faggots from the old wood pile, but when heat is needed, the man or town with wood to burn need not go cold.

Birmingham, Ala., Ledger—Forest fires in the West have been the factor which contributed the increase above the average. Still, when the total for the year is contemplated, the loss in values absolutely destroyed—gone, wiped out—is shocking. And this sort of thing has been going on for years and years and will continue to go on until building materials become so dear people will then begin to pay more attention to constructing of less inflammable materials, and of proper safeguards.

Grand Rapids Herald—For more than a decade Michigan has been talking about reforestation. First the talk was a mere whisper. Theorists saw the end of the great white pine cut and pointed to the need for replanting. But nobody listened. Then the pine finally disappeared, or nearly so, and reforestation commenced making converts. Still there was no action worthy of the name. But now there is a chance with the field open. Charles Lathrop Pack, president of the American Forestry Association, says: "If the business men of the Lake States want a forest experiment station, and want to get a start toward putting 20,000,000 acres of land to work growing trees, now is the time to speak." There is an opportunity for Michigan, Wisconsin and Minnesota to have such a station under federal grant. All that is required is an evidence of interest.

Hattiesburg, Miss., American—Ohio is planning to develop 200,000 acres of state forest and 100,000 acres of municipal forest, starting with an appropriation of $100,000. That is certainly a modest enough beginning, when it is considered that Ohio had originally 24,000,000 acres of forests.

Harrisburg Patriot—There will be general agreement that arrest and punishment is not inappropriate for persons responsible for disastrous forest fires whether the act was deliberate or negligent.

Forest and Stream—Man has flourished from time to time without one or more of all the other soil products, but he has never prospered without wood. The demand for wood is growing notwithstanding the discovery of substitutes, while wood is diminishing rapidly. Forests of the future must be provided by the people of today. Failure to do this will place upon present generations the guilt of adding a great burden to the cost of living and of shirking our beholden duty to civilization.

Milwaukee Journal—The cause of public forestry is making great headway in Wisconsin. The public is sensing, as never before, the opportunity to create stupendous wealth, to give a great impetus to industry and provide employment for many thousands in woods and mills and factories, as well as to rebeautify the state and increase exceedingly the tourist trade. The demand for forestry will continue to grow, for more and more the economic shoe will pinch and arouse people to the need for action.

Bring Back the Woods

I'VE CUT DOWN ABOUT EVERYTHING IN SIGHT, SO GUESS I'D BETTER PLANT A FEW TREES NOW!
OUR FORESTS
THE PRESENT GENERATION
AND WHEN IT STARTS TO GROW, WOODMAN SPARE THAT TREE!
COMMERCIALISM
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—Siebel—In the *Knickerbocker Press.*

"Spare That Tree"

HEY! CUT IT OUT! THAT'S A CRIME - BESIDES WE NEED OUR BEAUTY SPOTS, AND MORE TOO!
CUTTING OUR FOREST AREAS ETC
ATLANTA PARK AREA
CIVIC SPIRIT
KEEP OFF
INVASION OF NEW INDUSTRIES

—McGill—In the Atlanta *Georgian.*

Livingston, Mont., Enterprise—In Sweden the school teacher takes the youngsters once a week into the forests near the town and shows them how important the trees are. Sweden is a great exporter of lumber. Charles Lathrop Pack, president of the American Forestry Association, draws attention to the seriousness of the problem confronting us in the matter of future timber supplies. The lumber cut in the state of New York alone has dropped almost 60 per cent since 1910. In addition to teaching the children, the business men of the country are being taken by the hand by the American Forestry Association, which is constantly preaching on this subject. There should be no question of the need of putting millions of acres of idle lands to work millions of acres of idle lands to work.

McGregor, Ia., Times—In considering a national forest policy we must consider a disease. That disease is forest devastation, the American Forestry Association points out. Its effect is a slow sapping of national strength—through the steady exhaustion of the national timber supply.

Clinton, Ia., Advertiser—Many towns in Europe own a forest. Switzerland has 67 per cent of all her forests under town or communal ownership. These forests support the town and pay the taxes, the American Forestry Association of Washington

FOREST INSECTS IN THE NORTHEAST

By H. B. Peirson

State Forest Entomologist of Maine

THE subject of forest insects and their control is an extremely broad one in that it covers a multitudinous number of conditions and insects, each of which has its array of successors. Too little attention has been given to the destructiveness of these insect pests and few people realize that the yearly damage to our forests by these insects is greater than the loss caused by fire. Nevertheless this is true. Over 8,000,000 acres of timberland are destroyed yearly by insects. Reports based on actual cruises show that California, between 1910-1915, lost annually 155,000,000 feet in yellow pine alone. During a period of ten years bark-beetles destroyed 1,000,000,000 feet of timber in the Black Hills of South Dakota. Probably nowhere on the continent has the damage from insects been so great as in the forests of the northeast, particularly in the spruce forests of Maine.

Years ago it was believed that trees commonly died of old age and there are many people today who still hold to this belief. Investigations have shown that trees seldom if ever die of old age—they never get the chance, the one great exception being the world famed Sequoias of the Pacific slope, which for some unknown reason have been able to withstand insect attack. Nearly every conifer which dies will, if examined, show evidence of the attack of either insects or fungi, and at least ninety per cent of the loss is due to insects. This statement refers to the ever constant dying of trees which yearly amounts to approximately one per cent of the stand and does not refer to widespread disasters as caused by fire, wind or epidemics. When conditions become favorable these insects which are ever present in the forest become numerous enough to start an epidemic such as Maine has recently experienced in the wholesale destruction of spruce and fir by the spruce budworm and is now experiencing in the destruction of spruce by bark-beetles.

BURN FOLLOWING BUDWORM OUTBREAK

Owing to the vast amount of dry wood and tops left after a budworm epidemic, serious fires very often follow.

The history of past outbreaks of insects in the Northeast, particularly in Maine, is of especial interest in that it throws much light on what may be expected in the present and in future outbreaks. The earliest records in regard to the dying of spruce in the forests of the Northeast is found in a letter quoted by Packard. This letter written in 1818, mentions great destruction of spruce east of the Penobscot. Very little was written on this oubreak due to the fact that at this time very little spruce was being cut, white pine being the principal timber tree lumbered. The next outbreak occurred about 1880. The destruction wrought at this time brought forth much more attention, for spruce was being cut in large quantities. Such reports as "One billion feet of spruce killed along Allagash and tributaries of the St. John River," "great destruction of spruce in North Somerset County," and that "the slump in the amount of spruce coming down the rivers after the outbreak was very noticeable," are common.

There is no question in the writer's mind but that each of these past outbreaks started with a widespread budworm epidemic followed by bark-beetle outbreaks. The last outbreak of the budworm started about 1910 and lasted until 1919. This is being followed by swarms of bark-beetles which in many localities are attacking the green spruce, and proving a serious menace to the remaining timber.

It is well worth while to review in a few words an active outbreak. In the first place the budworm is present at all times in the spruce and fir stands of northern Maine. It is present in such small numbers that little or no attention is called by its feeding, which is limited almost entirely to the tops of the taller firs. When conditions become favorable—which in this case means the maturing of the fir—the budworm again finds an abundance of food in the sunlight, and eggs are laid by the moths on the needles at the tops of the fir trees that are in the sunlight. These eggs, which are laid from the first to the fifteenth of July, hatch in about ten days and the small caterpillars crawl into crevices in the bark beneath lichens or even into the small cones where they spin a small cocoon and thus pass the winter. They come out in the spring just before the balsam buds open and feed for three weeks or more on the foliage. An abundance of food and a favorable season means that most of the caterpillars will

A general view of the seasoning and storage facilities of the Snoqualmie Falls Lumber Company, one of the fifteen complete Weyerhaeuser manufacturing units

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The illustration above shows loaded cars at the entrance to the kilns of the Snoqualmie Falls Lumber Company. Note the even stacking and the precaution to secure the load to prevent twisting and warping during processing. Stickers are inserted between courses of boards to allow even circulation and drying.

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MANY concerns have for years been looking for an organization that could and would relieve them of their lumber buying worries; an organization that could look at lumber from *their* point of view.

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The Weyerhaeuser organization has for years studied industrial lumber needs. It has found that the best way to serve American Industry is to have ready at all times for a group of permanent customers the exact type of lumber in the correct grade, size and quantity they desire.

Such a service has its beginning way back in the forests, where trees that yield particular types of lumber that fit specific requirements, are marked for special cutting. Close grained, slow growth, even textured, cork-like White Pine logs, for example, are set aside for pattern stock. The same careful selection is practiced for all of the varied softwood requirements of industry.

Such painstaking efforts to serve industry are made possible through utilization of the vast resources and specialized equipment of the Weyerhaeuser organization.

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Scores of logging camps guaranteeing a steady stream of suitable raw material.

Fifteen complete modern manufacturing units.

Seasoning processes that prepare lumber scientifically for each exacting need.

Distributing facilities backed by fifteen immense mill stocks and two great strategically located distributing plants.

A corps of salesmen trained to think as purchasing agents and buyers have wished for lumber sellers to think.

EACH year more and more concerns realize what this type of lumber service means.

The Weyerhaeuser Sales Company distributes Weyerhaeuser Forest Products through the established trade channels. Its principal office is in Spokane, Washington, with branch offices at 208 So. La Salle St., Chicago; 220 Broadway, New York; Lexington Bldg., Baltimore; and 4th and Robert Sts., St. Paul; and with representatives throughout the country.

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Producers for industry of pattern and flask lumber, factory grades for remanufacturing, lumber for boxing and crating, structural timbers for industrial building. And each of these items in the species and type of wood best suited for the purpose.

mature and later turn into moths which in turn lay large numbers of eggs. Thus it is that an epidemic starts.

The moths in flying over the forest seek out and alight on the tops of fir trees. The first year feeding is almost exclusively on fir, spruce being almost free from injury. The second season again finds the moths in flight, some of which, however, remain and lay their eggs on the spruce. This accounts for the fact that the greatest injury is to the fir. Counts made on hundreds of thousands of trees show that the relation between dead spruce and dead fir is seldom greater than two to three. This emphasizes the fact that the intensity of an outbreak depends largely upon the amount of fir that is present in

AREA OVER WHICH INSECT HAS SWEPT

Spruce flat showing some typical budworm killed trees. The hairy moss which clings to the branches often gives the appearance of foliage in photographs.

a stand. This habit of the moths seeking fir that is growing in the sunlight accounts for the fact that spruce and fir found in mixture with hardwoods is fairly immune from budworm attack. It also accounts for the fact that spruce and fir coming up under the protection of hardwoods or budworm killed timber, is seldom damaged.

Many reasons have been given, all in good faith, for the periodic appearance of the budworm, but few of these take into account the fact that during an active outbreak the caterpillars are present in such swarms and over such a great territory that it is utterly inconceivable that either birds or parasites could check their advance. The one great factor is lack of suitable food. When the fir is gone the outbreak soon dwindles down to nothing. I do not want to detract from the great good that parasites and birds do in holding insects in check, but there comes a time when even these agencies are like a reed before a hurricane.

This brings us to the aftermath of a budworm outbreak. Conifers, unlike hardwoods, have very little reserve food, so that a single defoliation is a very serious matter and so weakens the tree that it is easily subject to attack by bark-beetles, other insects, and fungi. The yearly dying of trees following an outbreak has been found by the Canadian authorities to be comparable "to a greatly accelerated natural thinning that takes place in the normal forest." In other words, it is the suppressed, over-mature or weakened trees that go first. The greatest loss to the forest comes not from the defoliation by the budworm itself, but from these secondary enemies which swarm into areas where there are large numbers of weakened trees. Most of the field reports mention these bark-beetles and borers as being present in large numbers in the remaining timber. Trees defoliated and thus weakened by the budworm are also made very subject to winter killing and fungi. In sample plots taken in Canada over 75% of the dying fir was

SALVAGING THE DEAD AND DYING TIMBER

The increased demand for pulpwood during the war caused much of the then dead timber to be salvaged. This problem of salvaging dead timber is still a big factor in Maine.

found to be affected by a root fungus which itself easily kills weak trees.

An insect outbreak is very much like a fire in that if found in its early stages it is easily stamped out, but if allowed to run and assume great proportions the chances of stopping it under present forest conditions, are very slight. The control of the budworm must take the form of prevention rather than control. Knowing the habits and life history of the insect which are so set that strong interference at any point will upset their development it

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is possible to direct the control measures against the weakest point. In the case of the budworm this point seems to be the habit of passing the winter as first stage caterpillars that have just hatched from the eggs and that are so weak that unless suitable food is present when they emerge in the spring the caterpillars will soon die. How can this condition be brought about? Knowing that budworm outbreaks start up in isolated spots in the forest, and that it takes several seasons to gain headway enough to be a real menace to the forest, the most logical control would be for the timberland owner to send a small jobber into this area and clear out the infected stand during the winter. In the spring the young caterpillars coming out would find nothing but dry tops and would be unable to survive, their food supply having been cut off. Under ordinary conditions this method of control, which is at present being tried out in Maine, would not only be feasible but should pay for itself many fold. In the first place the infestation being located during its early stages would probably allow two seasons leeway to get into the area. The operation should, if

A TYPICAL FIRE TRAP

Type of spruce slope over which the budworm has swept, greatly increasing the fire hazard.

properly planned, practically, if not entirely, pay for itself. The protection to the surrounding timber would more than offset any financial loss due to the operation.

As to the bark-beetles—it is a common belief that these never attack green, healthy trees—this is a complete fallacy. In the normal forest it is not necessary for the beetles to attack the healthy green trees which are not particularly suited to their wants, owing to the fact that there are usually enough sickly trees or green windfalls to supply suitable feeding and breeding places. Large areas of sickly trees due to defoliation, or areas of green windfalls or even green slash mean that the bark-beetles will multiply rapidly. Ordinarily the outflow of sap or resin caused by the feeding of the bark-beetle drowns them, thus preventing their increase. In sickly or weak trees the flow of sap is much lessened and is not a serious detriment to the development of the beetles. It can readily be seen, however, that any great outflow of sap caused by the attack of the bark-beetles would so weaken the trees that they would become suitable breeding and feeding grounds. This is exactly what takes place during a bark-beetle epidemic and the trees are killed just

THE FOOD OF THE BUDWORM

Type of spruce and fir growth in which the spruce budworm and bark-beetles create great havoc.

as surely as if they were felled, the galleries made by the bark-beetles cutting off the flow of sap. There are two main reasons for the bark-beetle outbreaks. First in importance is the weakening of vast numbers of trees by the budworm in which the bark-beetles find favorable conditions for feeding and increasing. The second cause is the large amount of fresh slash left after cuttings. The time has apparently not come when slash disposal is practicable here in Northern Maine although it is being carried on on a large scale in Canada.

Outbreaks of bark-beetles can usually be controlled without great difficulty. The habits of the bark-beetles render them vulnerable by the only method that lumbermen could economically employ. The removal and utilization or burning of the trees is the most satisfactory control and an infestation can be checked in a single season. Floating the logs early in the spring, as is the usual custom, destroys the beetles. When only a portion of an infestation can be treated, control measures should be concentrated against the centers of infestation. Remarkable work is being carried on in the West in the

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prevention of bark-beetle outbreaks. Particular emphasis is placed upon trap trees to which the beetles are attracted and then destroyed. This method of control would not, however, be applicable in most of the forest region of Maine due to the vast amount of green slash and trees weakened by the budworm. The Canadian entomologists are also obtaining remarkable results in control of bark-beetles.

The control of both budworm and bark-beetles necessitates the locating of infestations in their infancy, and in order to do this it is essential that a considerable amount of the wild lands be patrolled, and that a forest entomologist be on hand to decide upon the necessary measures to meet the many varying conditions. In Maine the forests are admirably patrolled by a system of fire wardens and their assistants who for the most part are woodsmen acquainted with the budworm and its ravages. These men with the help of foresters and lumbermen who are constantly travelling through the forests should prove fairly efficient in locating insect outbreaks. Notifying the office it will be possible in most cases to get into the area and map out the control measures necessary. In this connection a general type map of the so-called Maine Forest District is in process of making. This map will show the danger areas in the State so that it will be possible in most cases to decide whether a small infestation is likely to spread over a wide area or not. For example, an infestation located in an area that is typically hardwood or mixed softwood, is not likely to prove serious, whereas an infestation located in an area where there are vast stands of spruce and fir is likely to prove very serious.

There is serious need of more research work along the lines of control and prevention here in the Northeast. The time is fast coming, if it is not already here, when a timberland owner will think twice before he will sit still and watch a third of his timber crop wiped out. The loss in many areas is absolutely inconceivable to those who have not seen it, and reports coming into the office from timberland owners who have made cruises on their lands for the damage are astounding. James W. Sewall, a Forest Engineer of Oldtown, Maine, who is probably as well acquainted with conditions in the Maine forests as any man in the State, estimates, from a large number of cruises he and his men have made throughout the State, that one-third of the total spruce and fir crop of the State was destroyed by the last outbreak of the budworm. The damage in Quebec and New Brunswick is beyond all belief. One of the most unfortunate results of the budworm damage is that the reproduction following an outbreak is largely fir. Owing to this ever-increasing percentage of balsam in the forest the next outbreak of the budworm is going to be far more severe than the last and it is essential that control or preventive measures be undertaken before an epidemic starts. Unfortunately, it is the usual custom to wait until the damage is done and then regret.

Other forest insects yearly take heavy tolls from the forests in the Northeast. The larch sawfly has so thoroughly killed off the larch or hackmatack that in most sections of the State it is a tree of the past. Poplar, birch, and maple are seriously injured by borers. The white pine weevil reduces the value of our pine crop by fully fifteen per cent, it being the direct cause of the so-called "cabbage pine" in which the tree becomes forked and much crooked.

A WOODLAND GARROTER

IN the August number of AMERICAN FORESTRY appeared an account of a duel to death between a strangling fig-tree and a swamp-bay. The picture of the struggle attracted widespread attention. From Miami, Florida, comes an unsigned letter enclosing a picture of a strangler described by the writer as the largest of its kind which he has ever seen in Florida. This picture is reproduced herewith. The strangler has reached the top of an oak 50 feet in height. Its binding limbs are 22 inches wide and nine inches thick. The grip on its victim is declared to be as tight as a steel bridge buckle and the picture makes this easily believable.

CANADIAN DEPARTMENT

By ELLWOOD WILSON

There is much interest in the Ontario situation in regard to an appointee as Commissioner of Conservation, the Premier having decided to put the care of all forest lands under this Commission. The position was offered to Dr. Judson Clark at $10,000 per year, but he declined it. He has made several important recommendations, among them being that a technical forester should be the head of the commission, and that the logging scale should be changed from the Doyle rule and all wood sold by the Government on cubic measure. The timber resources of Ontario are so important that it is hoped that it may be possible to obtain a good practical forester to handle the job. No one can have any success unless it is possible to make appointments free from political influence and unless politics can be eliminated in the management of the Department. It is regrettable that Doctor Clark could not see his way to accept this position, as he would have been an ideal man, having already been in the Department of Lands & Forests of Ontario, before going to the West.

Mr. R. G. Broadwood, late of the Indian Forest Service, and now attached to the Forestry Staff of the University of Edinburgh, is making a trip through Canada and the United States to study conditions here. He has been very much interested in our problems, especially along the lines of utilization, but he feels that we need to pay a great deal more attention to silviculture and to getting our forests on a sustained yield basis than we have ever done previously.

The Barnjum $5,000 prize for the best essay on the Control of the Spruce Bud Worm is about to be awarded; 210 essays were submitted, only four of which were good enough to even consider for the prize. Of these four, one stood out very much ahead of the others in a great many respects, and to this the prize will be awarded. The methods of control suggested are all very interesting and will prove of a great deal of value to the forestry departments of large limit holders and the Governments. Practically nothing new was brought out, although one new method which has been used for the control of other insect pests was suggested for the bud worm. The prize essay will be published as soon as possible, and will be of great practical interest.

Mr. Barnjum's work for the perpetuation and management on a sustained yield basis of our forests is beginning to bear fruit, and the public of Canada are becoming aroused to the necessity of taking immediate steps to stop forest fires and to cut our timber in a more sensible and scientific way.

Mr. Barnjum is determined that his work for conservation shall not cease in his own lifetime, and is training his son in proper methods of propaganda to assist him and to carry on his work in the future. Mr. Barnjum is continually traveling through the forests of Canada in an effort to get first hand information and he has offered to take a committee of members of Parliament for a two months' trip in the woods at his own expense, so that they may decide for themselves as to the reasonableness of his fears for the future. The Government has, however, unfortunately declined his offer.

All of the conifers are seeding heavily in Eastern Canada this fall, and an effort is being made to collect sufficient seed to carry over until the next seed year shall arrive. The Laurentide Company will collect from 2,000 to 3,000 pounds of white spruce seed, together with small amounts of white and red pine.

Generally speaking, seed years occur periodically, the white spruce seeding about every three years. In certain sections, however, trees have been known to seed annually, and one white spruce tree has been steadily growing on the bank of a small river, which has seeded continually every year for five years. It might be possible, by seed selection, to develop a strain in which the seeding will be annual.

At the request of the Quebec Forest Protective Association, the Quebec Government has decided to extend the time during which permits to travel in the woods will be required, from the 15th of August to the 15th of November. This is a step in the right direction, and already the value of the permit system has been shown during the present season.

The Ontario Government is doing splendid work in the reconnaissance of the timber areas in Northern Ontario. Two hundred hours of flying and sketching have already been used and large areas covered. Recently the Laurentide Air Service has taken a strip of photographs from Remi Lake, Ontario, to Moose Factory, for engineers of the Temiskaming & Northern Ontario Railway. The distance to Hudson Bay has now shrunk very considerably, as planes are traveling back and forth, taking only about 2½ to three hours for the trip, and a knowledge of this vast and hitherto unexplored northern country is being increased by leaps and bounds, and one of the most important steps in the management of its forests will have been taken, and Ontario knows just where its timber is located and how much there is.

Another very interesting piece of work has been done by the Fairchild Aerial Surveys Company (of Canada) Limited, in connection with the Laurentide Air Service, in photographing and making a complete report on a pulp mill plant and 450 square miles of timber limits. It was found that estimates made from the air by observation checked up within half a cord to the acre with those carefully made on the ground. The field work in compiling this report has taken six weeks; the field work alone by the old method would have taken six to eight months, and the information obtained would not have been anything like so complete or accurate. The Ontario Government, in their operations last year, found that in every case estimates made from the air checked up very closely for amounts per acre and character of timber with those made on the ground.

A Bad Fire Season

That after much anxiety until the end of August the backbone of one of the West's most dangerous fire seasons was broken, is the consensus of the reports received by the Western Forestry and Conservation Association from public and private fire-fighting agencies throughout the five Pacific Coast states. Except in a few localities the season was one of tremendous expense and taxed all protective organizations to their utmost to prevent sweeping loss of life and property.

Although light rains relieved the tension in many places early in August, there were 2000 fires during the month. The damage has not yet been accurately reported but is comparatively small, considering the great number of fires handled, because of the prompt action and extensive forces employed by the several protective agencies. Prosecutions for carelessness and incendiarism were numerous, over 50 convictions being secured during August. Lightning was also a prolific cause of fires, while in no previous season has there been so much complaint of those caused by cigarettes. In a number of instances moonshiners have added to the troubles of patrolmen and lookouts who have investigated distant smokes to find them arising from concealed stills.

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VAST TIMBER AREA OPENED

The largest compact body of yellow pine timber owned by the government is to be opened for sale and development, according to an announcement by the Forest Service. This is in line with the Federal policy of putting the forests of our country to their highest use, instead of locking up valuable timber resources so that they are of no benefit to the American people.

This new timber region is on the watershed of the Silvies River, in the Malheur National Forest of eastern Oregon. It covers an area of 550,000 acres and contains nearly seven billion feet of mature sawtimber.

Government foresters have worked out a plan of management for this stand of timber that provides a continuous perpetual supply of raw material for a lumber manufacturing industry to be located in the vicinity of Burns, Oregon, and capable of using from 50 to 60 million feet of logs annually.

The first block of this timber to be placed on the market is located on the Bear Valley watershed of the Silvies River, Malheur National Forest, near Burns, Oregon. The stand is estimated to contain 890 million feet of western yellow pine, Douglas fir, and lodgepole pine, which will be opened for logging development under Government regulations.

Tributary to the Bear Valley area are virgin forests containing over six billion feet of merchantable timber which will be available for future cutting. These timber units contain the finest and most extensive forests of yellow pine owned by the Government. They will be so developed, Federal experts say, that under the plan of management proposed the forests will produce an inexhaustible supply of timber.

INSECTS MENACE FORESTS

Although forest fires are considered, and undoubtedly are, the greatest menace to the timbered and cut over area of this State, says a report from Michigan, we must not lose sight of the fact that the depredations of wood and leaf eating insects, fungi growth and disease constitute a menace of great proportions.

One eminent authority has stated, that, "Within the next ten years, Michigan would not have a standing stick of tamarack," giving as his reason the destructive instincts of the saw fly. Thousands of acres are now infested with this destructive pest attacking maturer growth. The white pine blister and the pine weevil have invaded even the reforestated area, given over to young growth of white pine. It has been well established that every tree native to this State has its enemies, whether it be in the form of an insect or a disease growth and so far, other than the burning of infected areas, all measures for control have been left entirely with our insectivorous birds.

SHADE!

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FEDERAL FUNDS AID STATES

Allotments of $400,000 of Federal funds to states cooperating with the Government in protecting forest lands from fire have just been completed by the Forest Service, United States Department of Agriculture.

This sum, together with at least an equal amount which must be supplied by the states cooperating, is expended jointly by Federal and state agencies in protecting from fire forest lands at the headwaters of navigable streams. The allotment is made on the basis of timbered area and cost of adequate protection. The Federal expenditure in any state is restricted to not over $24,000.

According to the Forest Service, although the money is insufficient to insure adequate forest fire protection, it has in connection with state funds enabled substantial progress to be made in that direction.

Allotments to the various states are: Maine, $24,000; New Hampshire, $8,425; Vermont, $4,200; Massachusetts, $8,400; Rhode Island, $625; Connecticut, $3,150; New York, $24,000; New Jersey, $5,050; Pennsylvania, $24,000; Maryland, $3,850; Virginia, $18,200; West Virginia, $10,500; North Carolina, $12,000; Tennessee, $11,700; Louisiana, $21,000; Texas, $14,000; Ohio, $1,050; Michigan, $24,000; Wisconsin, $15,000; Minnesota, $24,000; South Dakota, $100; Montana, $13,725; Idaho, north, $21,000; Idaho, south, $2,300; Washington, $24,000; Oregon, $24,000, and California, $22,750.

GIANT TREE CENTURIES OLD

The "Great Tree of Tule" in the state of Oaxaca, after some 800 years of recorded existence, is beginning to show signs of wear and tear, says the Newark *Evening News*. This giant cypress, with a trunk so huge that thirty persons with outstretched arms can scarcely span it, is known to have been a fair-sized tree when Columbus discovered America, and history recounts that Cortes and his Spanish soldiers slept beneath its branches four centuries ago when en route to Honduras following their conquest of Mexico.

But although time has dealt kindly with the monarch, the correspondent during a recent visit to the tiny village of Santa Maria del Tule, Oaxaca, noticed that the wrinkles of age are beginning to show. There is no immediate cause for worry, however, that Tule, as the Indians affectionately call the tree, will wither away before the present generation has passed on. And even if it should, Tule has a son some fifty yards away from the parental boughs that is showing healthy signs of maintaining the family honor in the mat-

The Great Tree of Tule rises about 175 feet, and is said to be one of the largest specimens in the world. The spread of its branches is almost 150 feet. It stands in the court yard of a tiny church and is the only bid for popular interest made by the village of Santa Maria del Tule, whose population reveres the tree almost as much as one of its saints.

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HOW TO KNOW TRUE MAHOGANY

Under the name of "mahogany" the wood of more than 60 different kinds of trees has at one time or another been marketed, according to the Forest Service, United States Department of Agriculture. Most of these woods come from the tropics, but sometimes even American birch and red gum are used in furniture and sold as genuine mahogany. For the benefit of those who wish to be able to identify the various kinds of woods likely to be called mahogany the United States Department of Agriculture has issued a bulletin which tells how each kind may be distinguished.

Botanists class as "true mahogany" only trees of a single genus, called "Swietenia," of which five species are now known. True mahogany in this sense grows only in tropical America, from southern Florida and northern Mexico to northern South America, including the West Indies. But the same region furnishes other woods which may take the trade name of mahogany, as may also various woods from Africa and the Philippines, some of which are rather near relatives of true mahogany.

The question, "What is mahogany?" is therefore decidedly complex. Trade usage gives the name, with various degrees of property, to many kinds of imported woods, differing materially in cost and intrinsic quality, while the uncritical buyer may now be led to purchase as "genuine mahogany" articles manufactured from American woods of much lower value. Obviously such conditions raise difficult questions of trade ethics.

Those who wish to tell for themselves what kind of tree a piece of "mahogany" actually came from will find in Bulletin No. 1050 of the United States Department of Agriculture, The Identification of True Mahogany—Certain So-Called Mahoganies, and Some Common Substitutes, by Arthur Koehler, specialist in wood structure of the Forest Service, a carefully constructed key and detailed descriptions of the properties and structure of a considerable number of species of woods which reach the American markets under this name. A hand magnifying glass and a piece of the wood which can be cut to show structure and color are all the equipment needed to apply the key.

FERNOW HALL

The trustees of Cornell University, at a meeting held in June, decided to officially name the Forestry Building at Cornell "Fernow Hall." This action followed a recommendation made to Dean Mann of the College of Agriculture by the Forestry Department staff and subsequently approved by the Agricultural Council. It is, of course, a well-merited recognition of Dr. Fernow's lifetime activity in forestry and it is particularly appropriate that the Forestry Building at Cornell should bear the name of the director of the first forest school in the United States.

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BLIGHT-INFECTED CHESTNUT AS DURABLE AS SOUND CHESTNUT

Service records collected by the United States Forest Service indicate that chestnut posts, poles, and ties cut from blight-infected trees are as durable in service as similar timber cut from healthy trees. Inspections on posts in one locality during eight years of service showed that decay progresses about as rapidly in undiseased posts as in blight-infected posts.

The blight fungus attacks living trees and grows in the bark, particularly in the cambium layer, but it does not penetrate deeply into the wood itself. The blight finally kills the tree, effectively girdling it by separating the bark from the wood.

Blight-killed chestnut should be cut and utilized as soon as possible. Allowing dead trees to check and become infected with decay in the woods shortens the service life of timbers cut from the tree.

A "LITTLE SISTER" TO CRATER LAKE

"In the July issue of *American Forestry*, under a pretty picture of a little section of Crater Lake, Oregon," writes Mr. J. E. Pemberton, of San Francisco, "I find the following: 'There are crater lakes in other lands, but the one lake of its kind in the United States exceeds all others in beauty and magnificence of setting.'

"Now I do not wish to depreciate in the least Crater Lake for 'beauty and magnificence of setting.' Maybe the Creator could make something more beautiful and give it a more beautiful setting if He wished; but I have no reason to suspect that He ever did; and know no reason why He should. But there is *another* crater lake in this big, beautiful country of ours; and, in the eyes of many, it is quite the equal of Crater Lake, Oregon.

"It is known as Crystal Lake, and is near Quincy, in Plumas County, California. It is of much smaller size than Crater Lake but, otherwise, is almost a duplicate of it; has a strikingly similar 'setting' and I cannot recall any feature of either lake or its surroundings which could make it more beautiful, splendid or magnificent than the other. And adjectives are all too weak to describe either. Crater Lake is more gigantic, but that is the only advantage it has over Crystal Lake, and the advantage of mere size is a matter of opinion only. The fact that Crater Lake is so well known and its little sister crater lake, called Crystal Lake, so little known, well illustrates the maxim—'It pays to advertise.'"

KILN DRYING DOUGLAS FIR

A study of the kiln drying of Douglas fir common lumber has been begun in the Northwest by Albert Hermann, expert from the Forest Products Laboratory of the Forest Service. This work is being carried on under a cooperative agreement between the Forest Service and the West Coast Lumbermen's Association. Up to the present time lumbermen of this region have found it impossible to kiln dry common grades of Douglas fir lumber. The object of the study is to develop suitable drying methods for different thicknesses of Douglas fir common and to determine the loss in grade in drying which may be expected by these methods.

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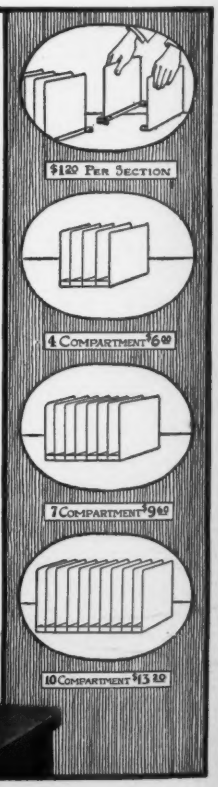

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